

**TECHNICAL MANUAL
MAINTENANCE INSTRUCTIONS
DEPOT
INLET/FAN MODULE
AIRCRAFT ENGINE
USAF MODEL
F100-PW-229**

**PRATT & WHITNEY
LARGE MILITARY ENGINES
UNITED TECHNOLOGIES CORPORATION
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THIS PUBLICATION IS ONE OF A SET OF TWELVE MANUALS. THE COMPLETE SET CONSISTING OF T.O. 2J-F100-53-1 THROUGH T.O. 2J-F100-53-11 AND T.O. 2J-F100-11-2 IS REQUIRED FOR DEPOT MAINTENANCE.

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RECORD OF CHANGES

Original	15 Aug 91	Change 16	15 Nov 95
Change 1	15 Nov 91	Change 17	15 Feb 96
Change 2	15 Feb 92	Change 18	15 May 96
Change 3	15 May 92	Change 19	15 Aug 96
Change 4	15 Nov 92	Change 20	15 Nov 96
Change 5	15 Feb 93	Change 21	15 Feb 97
Change 6	15 May 93	Change 22	15 May 97
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Change 10	15 May 94	Change 26	15 May 98
Change 11	15 Aug 94	Change 27	15 Aug 98
Change 12	15 Nov 94	Change 28	15 Nov 98
Change 13	15 Feb 95	Change 29	15 Feb 99
Change 14	15 May 95	Change 30	15 May 99
Change 15	15 Aug 95	Change 31	15 Aug 99

TOTAL NUMBER OF PAGES IN THIS MANUAL IS 908

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NUMERICAL INDEX OF EFFECTIVE WORK PACKAGES**NOTE**

Only those work packages and subordinate work packages assigned to this manual are listed in this index.

Insert Change No. 31 work packages and subordinate work packages, dated 15 Aug 99. Dispose of superseded work packages and subordinate work packages. If changed pages are issued to a work package or subordinate work package, insert the changed pages in the applicable work package or subordinate work package.

The portion of the text affected in a changed or revised WP or SWP is indicated by change bars in the outer margin of each column of text. Changes to illustrations are indicated by pointing hands or change bars, as applicable. Changes to wiring diagrams are indicated by shaded areas.

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*Zero in this Column Indicates an Original WP/SWP

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

This is a list of TCTO's applicable to this manual. TCTO's will also be listed in the work packages and subordinate work packages to which they apply.

T.O. No.	Date	Level	Title (ECP No.)	WP/SWP
2J-F100229-546	30 Sep 95	O/I	Modification of Retainer Ball	004 00
			Lock Pin Handle PWA 57614,	012 00
			F100-PW-229 Engine, F-15/F-16	013 00
			Aircraft (ECP 93QC038)	701 00
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				704 00
2J-F100229(I)-515	15 Oct 96	O/I	Retrofit of PN 4081566 First	013 00
			Stage Fan Shroud Featuring a	701 00
			Tighter Fit, F100-PW-229	801 00
			Engine, F-15/F-16 Aircraft	
			(ECP 93QA034)	
2J-F100229(I)-516	30 Nov 96	O/I	Replacement of PN 4075565 and	704 00
			PN 4075566 Compressor Inlet	705 00
			Variable Vane (CIVV) Actuator	801 00
			Rod Clevises, F100-PW-229	
			Engines, F-15 Aircraft	
			(ECP 95QA027)	

SAFETY SUMMARY

INTRODUCTION

This technical order (T.O.) describes physical and chemical processes which may require the use of chemicals, solvents, paints, or other commercially available hazardous material. This T.O. also describes maintenance actions which may require handling or use of potentially dangerous parts or equipment.

Personnel performing maintenance procedures and practices included in this T.O. shall be familiar with safety precautions and procedures associated with chemicals and other hazardous materials, parts and equipment. The user of this T.O. shall consult their local safety and health staff and Material Safety Data Sheet (MSDS) concerning any questions on hazardous chemicals, personal protective equipment requirements, and appropriate handling and emergency procedures. The user shall become completely familiar with the manufacturer/supplier information and adhere to the procedures, recommendations, warnings, and cautions of the manufacturer/supplier for the safe use, handling, storage, and disposal of these materials. Disregarding safety precautions and procedures or performing unauthorized maintenance can cause engine or equipment damage, serious injury, illness, or death.

WARNING, CAUTION, and NOTE STATEMENTS

WARNING

Highlights an essential operating or maintenance procedure, practice, condition, or statement which, if not strictly observed, could result in personal injury, loss of human life, or an acute/chronic health hazard.

CAUTION

Highlights an essential operating or maintenance procedure, practice, condition, or statement which, if not strictly observed, could result in equipment damage or destruction.

WARNINGS (for personnel protection) or CAUTIONS (for equipment protection) precede selected procedures in this T.O. for additional emphasis. WARNINGS and CAUTIONS are used where emphasis beyond the general safety precautions and instructions are required because the equipment, procedures, or work environment represents an unusual situation (nonroutine use or application) to the technician. The WARNING or CAUTION applies each time the related step is repeated.

NOTES

A note describes an unusual procedure or condition which special attention must be paid for a particular reason.

Notes are not part of safety. A note does not replace a warning or caution.

SAFETY SUMMARY (continued)

BACKUP WRENCH

When torquing or breaking torque on any tube coupling nut, use a suitable wrench to apply torque to the fitting to which the part is attached. Failure to properly use a backup wrench can result in failure of tubes and accessories due to stress loading during torquing procedures.

BEARING HANDLING

The most common cause of bearing damage is attributed to improper preservation and mishandling. Do not handle bearings with bare hands. Wear approved gloves when handling bearings. Coat bearings with engine oil and store in labeled containers as matched sets. Ensure all bearing components have matching serial numbers before installation to prevent bearing failure due to mismatched contact surfaces.

BRAZING, SOLDERING AND WELDING

Brazing, soldering and welding operations may produce fumes that can be harmful to breathe. Arc welding emits ultraviolet light, which can burn the skin and eyes. Provide adequate ventilation. Wear protective clothing/equipment. Ensure gas bottles are properly secured.

CABLES, ELECTRICAL

Small radius bends or severe flexing of electrical cables can result in damage to conductors and/or outer braid.

CARBON SEALS AND SEAL SEATS

Carbon seals and carbon seal seats are easily damaged and shall be handled with care. Do not allow carbon seals to come in contact with petroleum based solvents. These solvents will reduce the lubricity of the carbons and result in rapid seal wear. Do not handle carbon seals or seal seats with bare hands. Wear approved, lint free gloves.

CHEMICAL COMPOUNDS AND SOLUTIONS

Many of the chemical compounds and solutions used in cleaning, inspection, and repair may cause irritation to the skin, eyes, and respiratory system. Many of the chemicals, including their vapors, may be poisonous, easily ignited, corrosive, and react violently with incompatible materials. Improper mixing and combining of these chemicals may produce violent reactions, rapid heat generation, and explosive/toxic gases. Heating certain chemicals may cause toxic gases to be produced. Observe manufacturer's warning labels and Material Safety Data Sheet (MSDS) instructions for proper handling, storage, and disposal. Consult the local Safety Office for additional information.

COMPRESSED AIR

Compressed air can generate flying debris and can cause severe injury if air blast penetrates the skin or eyes. Reduce compressed air pressure for cleaning or drying to less than 30 psig. Use with effective chip guarding and personal protective equipment. Do not direct air blast toward other personnel.

SAFETY SUMMARY (continued)**COMPRESSED GASES**

Many compressed gases are highly flammable/explosive and can cause suffocation at varied levels of concentration or exposure time. Some of the gases can freeze body tissue. Keep ignition sources away. Provide adequate ventilation. Wear protective clothing/equipment. Store in properly marked/labeled containers at approved locations. Do not use in confined areas which may create an explosive atmosphere. Refer to specific Material Safety Data Sheet (MSDS) for additional information.

DANGEROUS PRESSURE

Pressure system precautions apply to all equipment using gases and fluids at all ranges of pressure. To avoid injury, stand clear of tooling and parts being pressure tested when pressure is being applied. Proper tool installation, shielding and hose connections shall be ensured before applying pressure. Ensure all system components are compatible with pressures applied and pressure medium used. Pressure shall be applied slowly.

ELECTROSTATIC DISCHARGE (ESD)

Circuit card assemblies and their related components may be damaged by undetectable electrostatic discharge. Care shall be used during handling or repair of these items. Use electrostatic discharge precautionary standard operating procedures.

ENGINE AND ACCESSORIES - TEMPERATURE

Aircraft engines and accessories are extremely hot following operation. Allow sufficient time to cool or wear protective clothing/equipment when maintenance or inspection tasks are required following engine operation. Failure to comply may result in injury to personnel.

ENGINE AND CONTROLS PRESERVATION

Engines and engine controls shall be drained of all fuel and preserved before shipping. Failure to drain fuel can result in a fire hazard. Engine preservation replaces any fuel with oil, which acts as a corrosion preventing agent.

FOREIGN OBJECT DAMAGE (FOD)

Foreign objects can enter engine compartments and accessories during maintenance. Always be aware of the potential for foreign object damage (FOD) entering any uncovered opening of an engine or accessory. Always thoroughly clean parts and compartments to remove all foreign material. Make a final detail inspection of the work area when the job is finished. Follow standard operating procedures for tool and equipment accountability.

FOOD AND TOBACCO

Wash hands and face thoroughly prior to smoking tobacco products or eating food. Residue of the materials used in engine and equipment maintenance can cause serious health problems if ingested or inhaled in the smoke.

HEARING PROTECTION

The frequency and intensity of noise generated during some operations may cause an acute or chronic hearing impairment. Wear approved hearing protection equipment. Contact the local safety office or bioenvironmental engineering for further guidance.

SAFETY SUMMARY (continued)

HYDRAULIC TOOLING

Application of hydraulic pressure to tooling or engine parts can cause them to jump with enough force to cause personal injury. Excessive pressure applied to tooling by a hydraulic pump can cause a structural failure to the engine part and/or the tooling which could result in personal injury. Using a ram with a nonapproved part number or exceeding hydraulic pump pressure can result in excessive pressure being applied to tooling. Do not exceed ram capacity for a given tool. Stand clear of tooling and engine parts during hydraulic tool operations.

JEWELRY

Remove rings, watches, necklaces, and other metallic objects that may be snagged or cause shock or burn hazards.

LEAD SEALS

Lead seals shall only be removed when specifically called for in the procedure. Lead seals identify areas of critical adjustment that can only be attained at the Depot or Vendor level.

LIFTING, ROTATING, AND SUPPORTING

Personnel shall stay clear of objects being lifted during hoist operations or when objects are supported by temporary transition supports. To prevent personal injury, use adequate number of personnel and appropriately rated lifting/handling devices to lift or move objects. Unless specified in the procedures, personnel shall not work on objects suspended by a hoist or supported by temporary transition supports. Personnel shall be prepared for potential unbalanced conditions during hoist operations.

LIVE ELECTRICAL CIRCUITS

Do not work on electrical systems, replace components, or make adjustments to equipment with the electrical supply turned on. Under certain conditions, danger may exist even when the power control is in the "off" position due to charges retained by capacitors. To avoid injuries, always remove power from, discharge, and ground a circuit prior to servicing. Adhere to all lock-out/tag-out requirements.

MAINTENANCE STANDS AND FIXTURES

Ensure modules or assemblies are firmly secured to work stands or fixtures before performing maintenance procedures. Personal injury or damage to modules or assemblies may occur if a work stand or fixture slips.

METAL MACHINING PROCESSES

Metal machining processes may generate dust, fumes, filings, and/or shavings which may cause acute/chronic irritation to the skin, eyes, digestive tract, and respiratory system. Metallic dust vapors may form a fire hazard when exposed to heat, flame, or when in contact with oxidizing agents. Prior to performing any metal machining process, personnel shall consult their local safety and health staff and the Material Safety Data Sheet (MSDS) to become familiar with the hazards and protective measures for a specific metal.

SAFETY SUMMARY (continued)**MOVING ENGINE**

Do not move an engine on work stand rails or transportation trailer without having installed proper supports, tie-rods, and flange adapters. Engine may shift or fall off rails and cause injury to personnel. When moving engine, do not push on engine. Use the engine support mount assemblies as a push point.

PACKING LUBRICATION (OIL AND FUEL SYSTEMS)

Use only the lubricant specified in the technical order to lubricate fuel and oil system packings. Use of an incompatible lubricant can cause oil foaming, clogging of critical fuel system filters, and packing deterioration leading to leakage, possible fire and engine shutdown.

PROTECTIVE CLOSURES AND COVERS

Install protective closures on all plumbing and components immediately upon removal. Install protective covers on engine modules, assemblies, parts, and compartments when not being worked.

QUICK RELEASE PINS

Do not force quick release pins into place as this may damage the self-locking feature of the pins. The compatibility of quick release pins is determined by the part number. Intermixing of pin part numbers during installation can result in loss of or failure of the quick release pins.

SHARP EDGED BLADES

Many blades have sharp edges. Wear protective gloves when handling bladed rotors and when installing or removing blades from rotors. Blades should only be used in their designed holder or rotor.

SUPER-CHILLED/HEATED PARTS AND EQUIPMENT

Super-chilled or heated parts and the equipment or agents used to heat or chill can cause burns, frostbite, or both. Wear temperature resistant gloves and other related protective clothing/equipment when handling chilled or heated parts or equipment. Super-chilled parts are fragile due to a lower resistance to impact. Heating parts beyond specified temperature limits can degrade heat treat qualities and result in part failure.

TEMPERATURE NORMALIZING

Allow heated or chilled parts to reach room temperature before applying final torque to fasteners. Failure to comply may result in improperly seated parts and/or mistorqued fasteners.

WORK BOLTS AND WORK NUTS

Work bolts and work nuts shall be permanently marked to distinguish them from engine bolts and nuts. Do not apply lubricants to work bolts and work nuts that will be replaced by engine bolts and nuts which require a thread sealant. Sealants will not adhere to threads contaminated with lubricants.

WORK PACKAGE

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INLET/FAN MODULE

EFFECTIVITY: ENGINE MODEL F100-PW-229

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Repair - - - - -	411 00
Support, Assembly, Compressor Inlet Variable Vane Cylinder	
Cleaning - - - - -	201 00
Inspection - - - - -	331 00
Installation - - - - -	704 00
Removal - - - - -	011 00
Support, Assembly, Variable Vane, Compressor Inlet	
Cleaning - - - - -	201 00
Inspection - - - - -	331 00
Installation - - - - -	704 00
Removal - - - - -	011 00
Support, Front Compressor Stator, Bell Crank, Inlet	
Cleaning - - - - -	201 00
Inspection - - - - -	325 00
Installation - - - - -	704 00
Removal - - - - -	011 00
Repair - - - - -	425 00
T	
Table of Limits, Inlet/Fan Module - - - - -	800 00
Tube Assembly, No. 1 Bearing Scavenge	
Cleaning - - - - -	201 00
Inspection - - - - -	302 00
Installation - - - - -	704 00
Removal - - - - -	011 00
Repair - - - - -	402 00
Tube Assembly Ps2, Sense	
Cleaning - - - - -	201 00
Inspection - - - - -	302 00
Installation - - - - -	704 00
Removal - - - - -	011 00
Repair - - - - -	402 00
V	
Vane, Front Compressor Stator Variable, Inlet	
Cleaning - - - - -	201 00
Inspection - - - - -	312 00
Installation - - - - -	603 00
Removal - - - - -	021 00
Repair - - - - -	412 00

WORK PACKAGE

INTRODUCTION

INLET/FAN MODULE

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	23	4 - 5	19	7	1
3	8	6	2	8 Blank	8

1. INTRODUCTION.

- a. This technical order contains depot maintenance instructions for the Inlet/Fan Module.

2. CONTENTS, ARRANGEMENT, AND NUMBERING OF WORK PACKAGES.

- a. This technical order contains work packages (WP) arranged in functional groups. A block of five digit numbers has been reserved for each group.
- b. The first WP in each functional group is the introductory work package. The introductory work package provides a listing of all the work packages within that group by title and number.

WP Block Numbers	Functional Group
001 00	Alphabetical Index
002 00	Introduction
003 00	Module Removal/
through 009 00	Installation in Shipping Container
010 00	Module Dismantling
through 019 00	
020 00	Disassembly of
through 199 00	Subassemblies

WP Block Numbers	Functional Group
200 00	Cleaning
through 299 00	
300 00	Inspection
through 399 00	
400 00	Repair
through 499 00	
500 00	Open
through 599 00	
600 00	Assembly of Subassemblies
through 699 00	
700 00	Final Assembly
through 799 00	
800 00	Table of Limits
through 899 00	

3. CHANGE REQUEST.

- a. Recommendations for specific changes to this technical order (TO) shall be submitted on an AFTO Form 22 to SA-ALC/LPCQ (TOMA), Kelly AFB, TX 78241-6421 in accordance with T.O. 00-5-1.

4. PICTORIAL INDEX.

(See FO-1 and Table 1.)

- a. The pictorial index is used to identify each work package and associated part requiring intermediate maintenance.

5. LEADING PARTICULARS.

- a. The following is a list of leading particulars for the Inlet/Fan Module.

INLET FAN MODULE

Diameter: 37 inches
Length: 21 inches
Weight: 435 pounds (dry weight)

6. TYPICAL PART NUMBER.

- a. When the word typical precedes a part number, that part number is one of several that may be used in that location. By referring to typical part number in the Illustrated Parts Breakdown (T.O. 2J-F100-54), all applicable part numbers can be found.
- b. Instructions in this technical order for a typical part number also apply to the other (superseding) part numbers. When a part number is used without the word typical, it means that the procedure applies only to that part number.

7. LOCALLY MANUFACTURED SUPPORT EQUIPMENT.

- a. Locally manufactured support equipment may be manufactured by using activity or by a supplier.
- b. Locally manufactured support equipment is listed in the Master Numerical List of Support Equipment in T.O. 2J-F100-53-3 and the Applicable Support and Illustrated Support Equipment sections of maintenance WPs/SWPs.
- c. Locally manufactured support equipment is identified in these WPs/SWPs by the prefix LM and a four digit number (LM 0123), or by the prefix LM followed by the PWA number (LM PWA 51203).
- d. When an LM tool is identified in a maintenance WPs/SWPs, all data required to make the tool will be found in T.O. 2J-F100-53-3, WP 050 00.

Table 1. Inlet/Fan Module - Pictorial Index (See FO-1.)

INDEX NO.	NAME	REM	DISASSY	CLEAN	INSP	REPAIR	ASSY	INSTL	OTHER
1	INLET/FAN MODULE FRONT SECTION EXTERNAL PARTS	- 011 00	012 00 -	200 00 -	- -	- -	701 00 -	- 704 00	- -
2	RING ASSEMBLY, SYNCHRONIZING, FRONT COMPRESSOR STATOR, INLET	011 00	-	201 00	308 00	408 00	-	704 00	-
3	CONNECTING LINK, RIGID, FRONT COMPRESSOR STATOR	011 00	-	201 00	326 00	-	-	704 00	-
4	BELL CRANK ASSEMBLY, FRONT COMPRESSOR STATOR LINKAGE, INLET	011 00	-	201 00	327 00	-	-	704 00	-
5	SUPPORT, FRONT COMPRESSOR STATOR BELL CRANK, INLET	011 00	-	201 00	325 00	425 00	-	704 00	-
6	CLEVIS, ROD END	011 00	-	201 00	328 00	-	-	704 00	-
7	CONNECTING LINK, COMPRESSOR STATOR, INLET	011 00	-	201 00	326 00	-	-	704 00	-
8	CONTROL AND CYLINDER, VARIABLE VANE, COMPRESSOR INLET	011 00	-	@	@	@	-	704 00	705 00
9	SUPPORT ASSEMBLY, VARIABLE VANE, COMPRESSOR INLET	011 00	-	201 00	331 00	-	-	704 00	-
10	NUT, BEARING RETAINING, INTERNALLY THREADED, NO. 1 BEARING	012 00	-	201 00	303 00	403 00	-	702 00	-
11	INVERTED NUT, SPANNER, NO. 1 BEARING	012 00	-	201 00	303 00	403 00	-	702 00	-
12	BEARING ASSEMBLY	012 00	-	201 00	304 00	404 00	-	702 00	-

@ REFER TO T.O. 2J-F100-53-4.

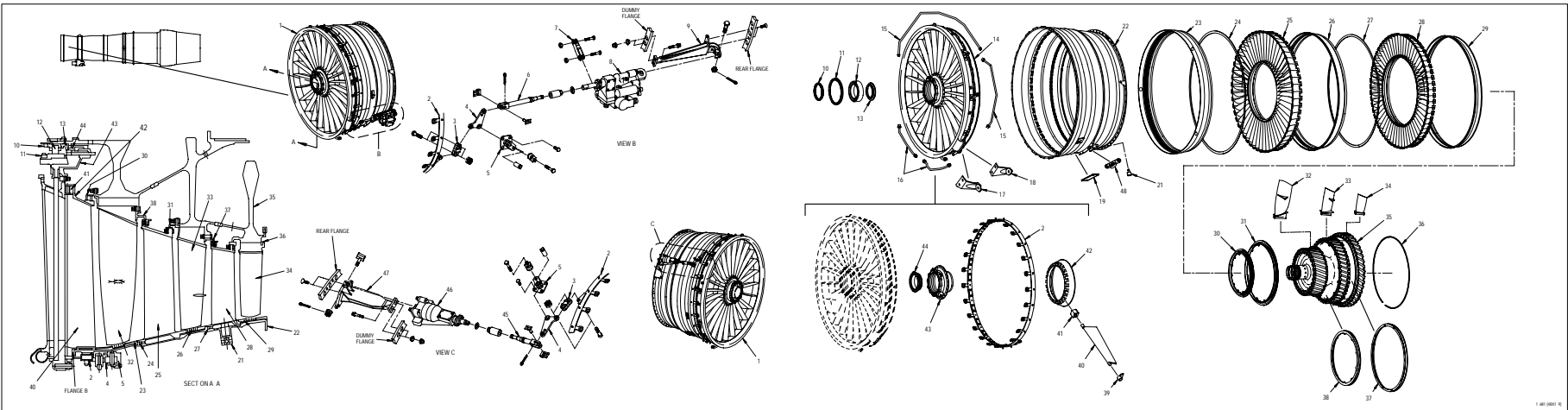
Table 1. Inlet/Fan Module - Pictorial Index (See FO-1.)(continued)

INDEX NO.	NAME	REM	DISASSY	CLEAN	INSP	REPAIR	ASSY	INSTL	OTHER
13	SEAT, NO. 1 BEARING SEAL	012 00	-	201 00	305 00	405 00	-	702 00	-
14	CASE ASSEMBLY, FAN INLET	012 00	021 00	201 00	310 00	410 00	603 00	702 00	-
15	TUBE ASSEMBLY, Ps2, SENSE	011 00	-	201 00	302 00	402 00	-	704 00	-
16	TUBE ASSEMBLY, SCAVENGE, NO. 1 BEARING	011 00	-	201 00	302 00	402 00	-	704 00	-
17	BRACKET, ENGINE DIAGNOSTIC UNIT, LOWER FRONT	012 00	-	201 00	323 00	-	-	702 00	-
18	BRACKET, ENGINE DIAGNOSTIC UNIT, UPPER FRONT	012 00	-	201 00	323 00	-	-	702 00	-
19	PLATE, IDENTIFICATION	-	-	-	324 00	-	-	-	-
20	DELETED								
21	PLUG, BORESCOPE FAN CASE, SECOND STAGE	013 00	-	201 00	-	-	-	701 00	-
22	CASE ASSEMBLY, FAN	013 00	-	201 00	324 00	424 00	-	702 00	-
23	SEAL, AIR, FAN FIRST STAGE	013 00	-	201 00	316 00	-	-	701 00	-
24	LOCK, COMPRESSOR STATOR	013 00	-	201 00	317 00	-	-	701 00	-
25	COMPRESSOR STATOR ASSEMBLY, FIRST STAGE	013 00	-	201 00	318 00	418 00	-	701 00	-
26	SEAL, AIR, FAN, SECOND STAGE	013 00	-	201 00	316 00	-	-	701 00	-
27	LOCK, COMPRESSOR STATOR	013 00	-	201 00	317 00	-	-	701 00	-
28	COMPRESSOR STATOR ASSEMBLY, SECOND STAGE	013 00	-	201 00	318 00	418 00	-	701 00	-
29	SEAL, AIR, FAN THIRD STAGE	013 00	-	201 00	316 00	-	-	701 00	-
30	SEAL, AIR, FRONT COMPRESSOR, INLET	013 00	-	201 00	313 00	-	-	701 00	-
31	SEAL, AIR, COMPRESSOR, REAR, FIRST STAGE	013 00	-	201 00	314 00	-	-	701 00	-
32	BLADE ASSEMBLY, COMPRESSOR ROTOR, FIRST STAGE	013 00	-	201 00	315 00	415 00	-	701 00	604 00

Table 1. Inlet/Fan Module - Pictorial Index (See FO-1.) (continued)

INDEX NO.	NAME	REM	DISASSY	CLEAN	INSP	REPAIR	ASSY	INSTL	OTHER
33	BLADE ASSEMBLY, COMPRESSOR ROTOR, SECOND STAGE	013 00	-	201 00	315 00	415 00	-	701 00	604 00
34	BLADE, COMPRESSOR ROTOR, THIRD STAGE	011 00	-	201 00	315 00	415 00	-	701 00	604 00
35	DISK ASSEMBLY, DRUM ROTOR, FRONT COMPRESSOR	013 00	-	201 00	322 00	-	-	701 00	-
36	RING, COMPRESSOR BLADE LOCK, THIRD STAGE	011 00	-	201 00	321 00	-	-	701 00	-
37	SEAL, AIR, COMPRESSOR, FRONT, SECOND STAGE	013 00	-	201 00	320 00	-	-	701 00	-
38	SEAL, AIR, COMPRESSOR, FRONT, FIRST STAGE	013 00	-	201 00	319 00	-	-	701 00	-
39	BEARING, COMPRESSOR STATOR, INLET	021 00	-	201 00	312 00	-	-	603 00	-
40	VANE, FRONT COMPRESSOR STATOR VARIABLE, INLET	021 00	-	201 00	312 00	412 00	-	603 00	-
41	BEARING, COMPRESSOR STATOR, INLET	021 00	-	201 00	312 00	-	-	603 00	-
42	SHROUD, FRONT COMPRESSOR STATOR, INLET	021 00	-	201 00	311 00	411 00	-	603 00	-
43	HOUSING ASSEMBLY, NO. 1 BEARING	021 00	022 00	201 00	307 00	407 00	601 00	603 00	-
44	SEAL - FACE ASSEMBLY, NO. 1 BEARING	022 00	-	201 00	306 00	406 00	-	601 00	-
45	CLEVIS ROD END	011 00	-	201 00	328 00	-	-	704 00	-
46	CYLINDER - ACTUATING, LINEAR, VARIABLE VANE, COMPRESSOR INLET	011 00	-	@	@	@	-	704 00	705 00
47	SUPPORT ASSEMBLY, COMPRESSOR INLET VARIABLE VANE CYLINDER	011 00	-	201 00	331 00	-	-	704 00	-

@ REFER TO T.O. 2J-F100-53-4.



FO-1. Inlet/Fan Module - Pictorial Index

WORK PACKAGE

INTRODUCTION

SHIPPING CONTAINER, INLET/FAN MODULE -

REMOVAL/INSTALLATION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2					0

1. INTRODUCTION.

This work package introduces the 003 00 through 009 00 series work packages for Inlet/Fan Module Shipping Container. The following work packages are included in this series.

WP No.	Title
004 00	Shipping Container, Inlet/Fan Module - Removal
005 00	Shipping Container, Inlet/Fan Module - Installation
006 00 through 009 00	Open

WORK PACKAGE**TECHNICAL PROCEDURES****SHIPPING CONTAINER, INLET/FAN MODULE -****REMOVAL****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 12

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	27	4	15	8A - 8B Added	27
2	15	5	0	9	27
3	13	6 - 8	27	10 Blank	27

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

T.O. No.	Date	Level	Title (ECP No.)
T.O. 2J-F100229-546	30 Sep 95	O/I,D	Modification of Retainer Ball Lock Pin Handle PWA 57614, F100-PW-229 Engine, F-15/F-16 Aircraft (ECP 93QC038)

CONSUMABLE MATERIALS

None

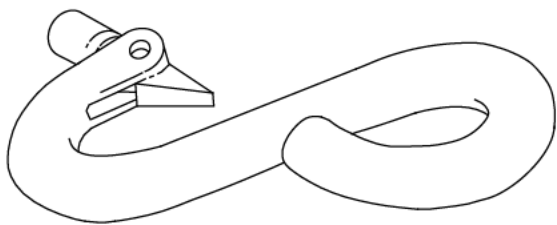
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

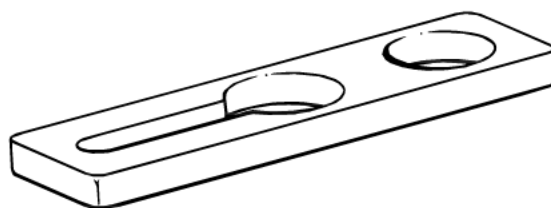
Paragraph	Function - Tool Nomenclature	Tool Number
2	Inlet/Fan Module - Removal from Shipping Container	
	Hook, Lifting - - - - -	PWA 2388
	Spacer, Module Support Stand - - - - -	PWA 50993
	Adapter, Trunnion (two required) - - - - -	PWA 26147
	Sling, handling - - - - -	PWA 56336
	Stand, Inlet/Fan Module, storage and disassembly	PWA 56338
		or
		PWA 50775
	Retainer, Inlet/Fan Module front handling - - - -	PWA 57803
		or
		PWA 57614
	Retainer, Inlet/Fan Module rear handling - - - -	PWA 57615

ILLUSTRATED SUPPORT EQUIPMENT



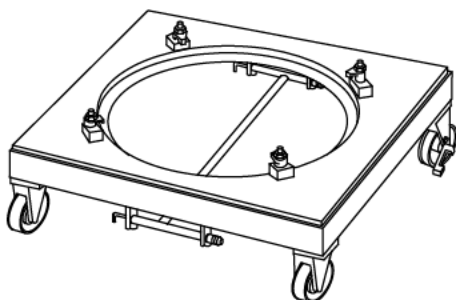
PWA 2388 -C

Figure T1. PWA 2388 Hook



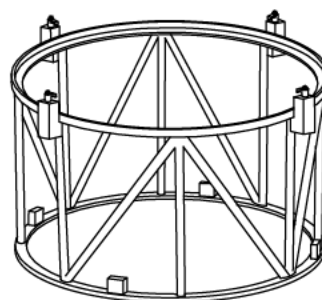
PWA 26147 -C

Figure T2. PWA 26147 Adapter



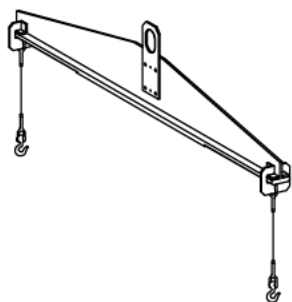
PWA 50775 -C

Figure T2A. PWA 50775 Stand



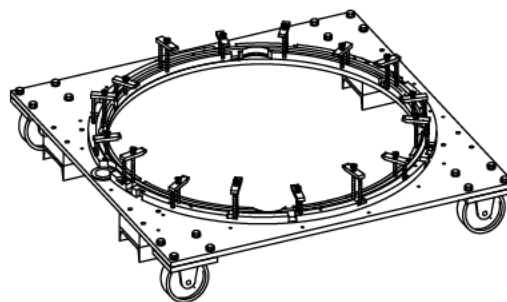
PWA 50993 -C

Figure T3. PWA 50993 Spacer



PWA 56336 -C

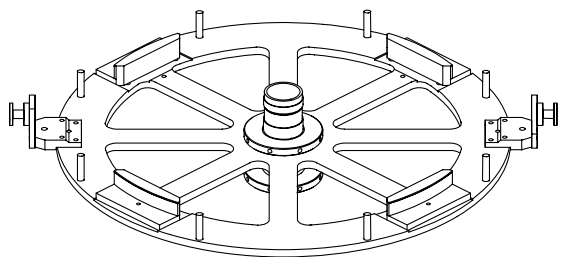
Figure T4. PWA 56336 Sling



PWA 56338 -C

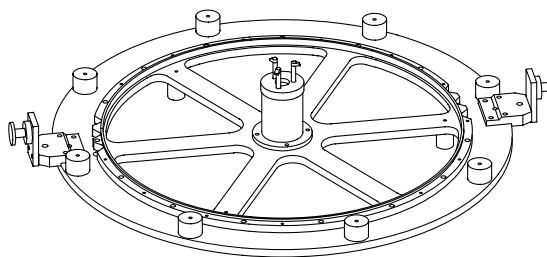
Figure T5. PWA 56338 Stand

ILLUSTRATED SUPPORT EQUIPMENT (continued)



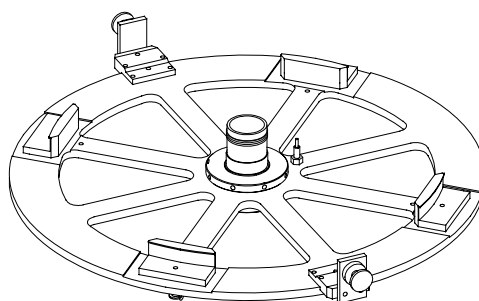
PWA 57614 -C

Figure T6. PWA 57614 Retainer



PWA 57615 -C

Figure T7. PWA 57615 Retainer



PWA 57803 -C

Figure T8. PWA 57803 Retainer

1. INTRODUCTION.

- a. This work package contains instructions for removal of inlet/fan module from shipping container.

2. INLET/FAN MODULE - REMOVAL FROM SHIPPING CONTAINER.

(See Figures 1, 1A, and 2.)

NOTE

Shipping container is one of two configurations: P4070553, configured specifically for F100-PW-229 inlet/fan module, and P4078842, universally configured for all F100 inlet/fan modules.

- a. Remove all records and papers from record receptacle(4, figures 1 and 1A), on side of container.
- b. Release air pressure from container by pressing button on air pressure relief valve(3).
- c. Remove humidity indicator(2).
- d. Release turnlock fasteners(6) by loosening adjusting screws(5) with 3/16 hex key and turning turnlock fastener 1/4 turn counterclockwise. Remove cover(1) using PWA 56336 sling. If cover is placed on floor, protect fastener hardware and sealing surface of cover by placing blocks under cover flange.



Care must be used during module removal to prevent No. 1 bearing contamination caused by rust corrosion and scale from shipping container tierod and associated hardware.

- e. For P4070553 shipping container, proceed as follows: (See figure 1.)

(1) Remove cover(7).

(2) Inspect tierod(12), keyway washer(10), washer(9), and nut(8) for rust corrosion. Do not attempt to remove rust at this time. During module removal, protect No. 1 bearing from any rust contamination present on container suspension system.

- (3) Remove lockwire, nut(8), washer(9), and keyway washer(10) from tierod(12). Proceed to step g.

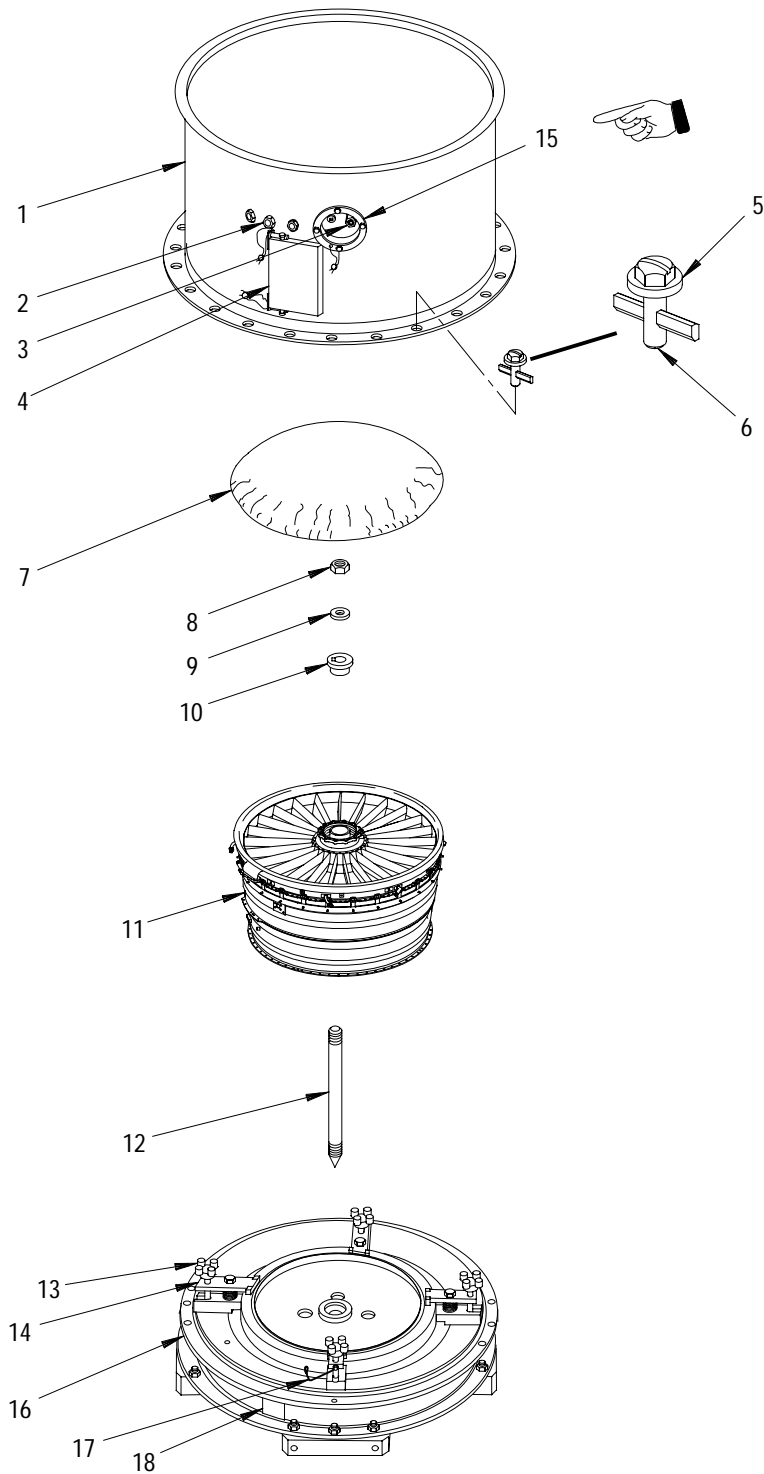
- f. For P4078842 shipping container, proceed as follows: (See figure 1A.)

(1) Remove lockwire, nut(8), washer(9), cover(7), and keyway washer(10) from tierod(12).

(2) Inspect tierod(12), keyway washer(10), washer(9), and nut(8) for rust corrosion. Do not attempt to remove rust at this time. During module removal, protect No. 1 bearing from any rust contamination present on container suspension system.

Legend for figure 1

1. Cover	10. Keyway washer
2. Humidity indicator	11. Inlet/fan module
3. Air pressure relief valve	12. Tierod
4. Record receptacle	13. Knob
5. Adjusting screw	14. Clamp
6. Turnlock fastener	15. Desiccant access port cover
7. Cover	16. Base
8. Nut	17. Retainer spring
9. Washer	18. Identification plate



104559 (48X2)

Figure 1. Inlet/Fan Module - Removal From Shipping Container (P4070553)



Legend for figure 1A

1. Cover
 2. Humidity indicator
 3. Air pressure relief valve
 4. Record receptacle
 5. Adjusting screw
 6. Turnlock fastener
 7. P4078969 cover
 8. Nut
 9. Washer
 10. Keyway washer
 11. Inlet/fan module
 12. Tierod
 13. Knob
 14. Clamp
 15. Desiccant access port cover
 16. Base
 17. Retainer spring
 18. Identification plate
- g. Unlock retainer springs(17, figures 1 and 1A) from knobs(13), loosen knobs(13) and slide clamps(14) away from module(11) rear flange.
- h. Install PWA 57803 front retainer as follows:
- (1) Thread PWA 57803 retainer detail-2 shaft(8, figure 2) into drum rotor shaft(9) until bottomed out.
 - (2) Thread lower detail-3 nut(1) approximately 1/4 inch beyond end of threads on detail-2 shaft(8).
 - (3) Loosen detail-20 bolts(3) and position detail-5 slide jaws(5) inward.
 - (4) Using overhead hoist, PWA 26147 adapters, PWA 56336 sling, and PWA 2388 hook, lower detail-1 base(2). Align guide pin with locator hole on fan inlet case ID flange.
 - (5) Move detail-5 slide jaws(5) outward until they fully engage slot(6) in fan inlet case. Secure using detail-4 ball lock pins(4). Tighten 8 detail-20 bolts(3).
 - (6) Tighten lower detail-3 nut(1) until snug against detail-1 base(2).
 - (7) Thread upper detail-3 nut(1) onto detail-2 shaft(8) until snug against detail-1 base(2).

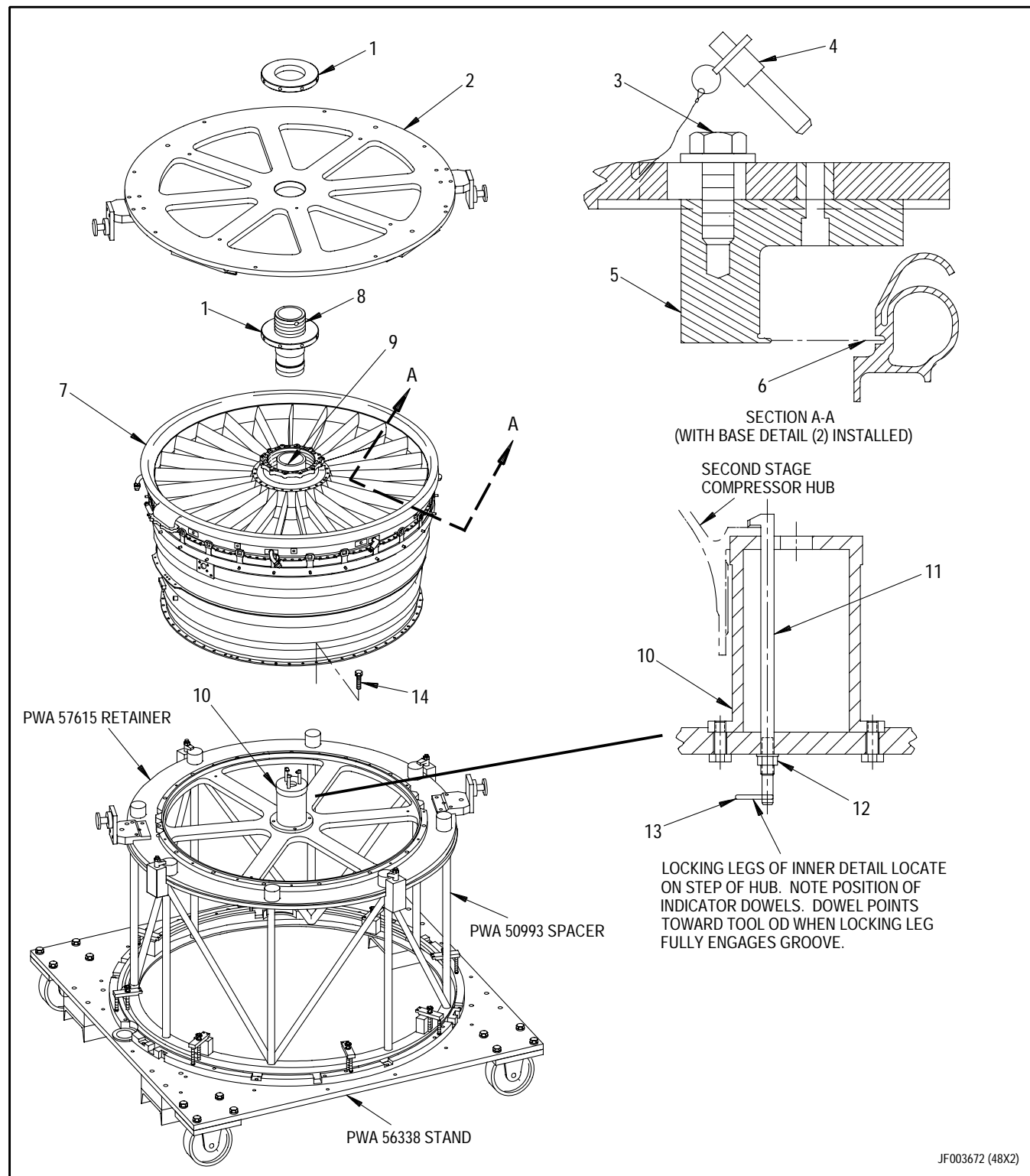


Figure 2. Inlet/Fan Module - Installation on PWA 57615 Retainer

Legend for figure 2

1. Nut Detail
 2. Base Detail
 3. Bolt
 4. Ball Lock Pin
 5. Slide Jaw Detail
 6. Slot
 7. Inlet/Fan Module
 8. Shaft Detail
 9. Drum Rotor Shaft
 10. Inner Detail
 11. Locking Leg
 12. Nut
 13. Dowel Pin
 14. Bolt
- i. Position flat side of PWA 56338 detail-33 locating ring facing up for PWA 50993 spacer installation.
 - j. Install and secure PWA 50993 spacer onto PWA 56338 stand.
 - k. Install and secure PWA 57615 rear retainer onto PWA 50993 spacer.
 - l. Install inlet/fan module(7) onto PWA 57615 retainer as follows:

NOTE

Dowel pins(13) indicate position of locking legs(11) per figure 2.

- (1) Loosen nuts(12) securing locking legs(11) on inner detail(10) of PWA 57615 retainer, and turn legs inward.
- (2) Attach PWA 26147 trunnion adapters to spools of PWA 57803 retainer. Using hoist, PWA 2388 hook, and PWA 6580 sling, lift inlet/fan module(7) from base(16, figures 1 and 1A).
- (3) Carefully install module onto PWA 57615 retainer, aligning dowel pin on base detail with dowel pin hole in inlet/fan module(7, figure 2). Secure base detail by turning detail-25 locking legs(11) outward. Tighten nuts(12) to secure locking legs(11).
- (4) Secure module rear flange to retainer using bolts(14). Remove hoist, hook, sling, and adapters.
- m. Assemble container details by reverse of disassembly procedure and store container for future use.

WORK PACKAGE

TECHNICAL PROCEDURES

SHIPPING CONTAINER, INLET/FAN MODULE -

INSTALLATION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 16

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	27	4B Blank Added	27	7	0
2	0	5	0	8	27
3 - 4	27	6	27	9	13
4A Added	27			10 - 14	27

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Methyl Ethyl Ketone (MEK)	TT-M-261
Oil, Corrosion Preventative (PMC 9101)	MIL-C-15074
Oil, lubricating	MIL-L-7808

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
Card, humidity indicator	P50844	1
Consumable packaging parts, inlet fan module	P4078921	1
Cap, protective	* P10163	3
Cap, protective	* P10547	1
Cap, protective	* P4021568-01	2
Cap, protective	* P4021568-02	2
Cap, protective	* P4021568-03	1
Cap, protective	* P4021568-04	1
Cover	* P4070544	1
Cover, protective	* P4070546	1
Desiccant	* P8320	4
Lockwire	* MS20995-C41	As required

EXPENDABLE ITEMS (continued)

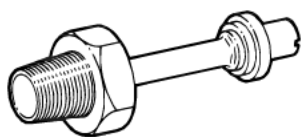
Nomenclature	Part Number	Quantity
Plug, protective	* P12761	2
Plug, protective	* P12771	1
Plug, protective	* P31100	2
Plug, protective	* P4021572-01	3
Plug, protective	* P4021572-02	4
Seal, lead	* 83280	3
Strap	* MS3367-5-9	6

* Details of P4070553 Container Assembly

APPLICABLE SUPPORT EQUIPMENT

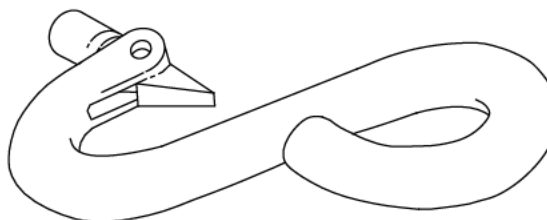
Paragraph	Function - Tool Nomenclature	Tool Number
2	INLET/FAN MODULE - INSTALLATION INTO SHIPPING CONTAINER	
	SLING, ADJUSTABLE MODULE HANDLING, 2000 LB CAPACITY (LONG AND SHORT CABLES) - - - - -	PWA 56336
	SPACER, MODULE SUPPORT STAND - - - - -	PWA 50993
	RETAINER, INLET/FAN MODULE, HANDLING, FRONT - - - - -	PWA 57803
	RETAINER, INLET, FAN MODULE HANDLING, REAR - - - - -	PWA 57615
	HOOK, SAFETY - - - - -	PWA 2388
	ADAPTER, TRUNNION (TWO REQUIRED) - - - - -	PWA 26147
	VALVE - - - - -	PN 645A-6

ILLUSTRATED SUPPORT EQUIPMENT



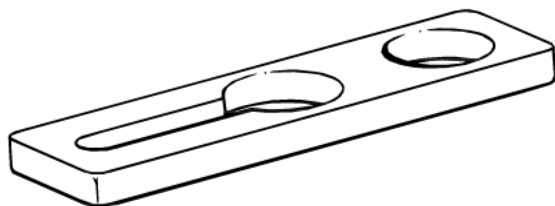
PN 645A-6 -C

Figure T1. PN 645A-6 VALVE



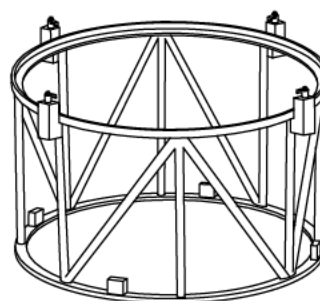
PWA 2388 -C

Figure T2. PWA 2388 HOOK



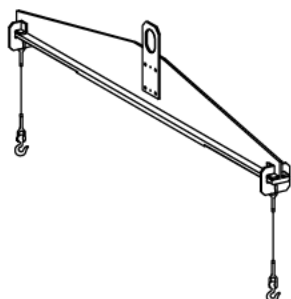
PWA 26147 -C

Figure T3. PWA 26147 ADAPTER



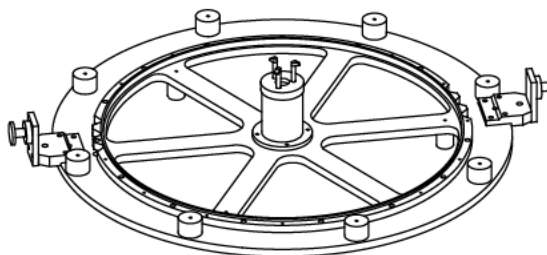
PWA 50993 -C

Figure T4. PWA 50993 SPACER



PWA 56336 -C

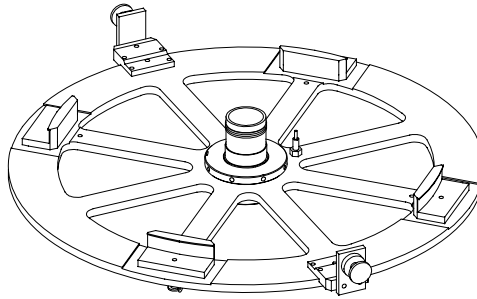
Figure T5. PWA 56336 SLING



PWA 57615 -C

Figure T6. PWA 57615 RETAINER

ILLUSTRATED SUPPORT EQUIPMENT (continued)



PWA 57803 -C

Figure T7. PWA 57803 RETAINER

1. INTRODUCTION.

- a. This work package contains instructions for installation of inlet/fan module into shipping container.

2. INLET/FAN MODULE - INSTALLATION INTO SHIPPING CONTAINER.

(See Figures 1, 2, 3, and 4.)

NOTE

Shipping container is one of two configurations; P4070553, specifically configured for F100-PW-229 inlet/fan modules, and P4078842, universally configured for all F100 inlet/fan modules.

a. Disassemble, clean, and inspect shipping container as follows:

- (1) Loosen adjusting screws(5, figures 3 and 4) in shank end of all turnlock fasteners(6) with 3/16 hex key.
- (2) Release all turnlock fasteners by turning each fastener counterclockwise 1/4 turn.
- (3) Using PWA 56336 sling and chain hoist, remove container cover.
- (4) Place several wood blocks on floor to support and protect cover flange sealing surface. Lower cover onto blocks.
- (5) Check condition of container identification plates(18) on container cover and base as shown in figures 3 and 4. If required, install new container identification plate per paragraph 3.
- (6) Inspect tierod and associated hardware for rust corrosion(12, 8, 9, and 10).
- (7) Clean tierod and hardware as required and apply a light coat of MIL-C-15074 corrosion preventative oil or MIL-C-7808 lubricating oil. Refer to T.O. 2-1-111.

NOTE

P4078842 shipping container includes ring spacers and tierod spacer for mounting F100-PW-100, -200, and -220/220E inlet/fan module rear flange to container base. These items are not used for F100-PW-229 inlet/fan modules.

- (8) For P4078842 shipping container, verify five ring spacers(21, 22, 23, 24, and 25 figure 4) are removed from adapter ring segments(20) and secured to storage ring(26) on cover(7), and spacer(19) is removed from tierod(12) and is stored in desiccant basket located behind desiccant access port cover(15). If not, go to steps a.(9), a.(10), and a.(11).
- (9) Remove five ring spacers(21, 22, 23, 24, and 25) from adapter ring segments(20).
- (10) Position five ring spacers with sides marked THIS SIDE UP onto storage ring(26) by inserting ring spacer dowel pins into storage ring dowel pin holes. Secure ring spacers to storage ring with captured screws on cables attached to cover(7).

Legend for figure 1

- 1.PN P10163 cap, protective
- 2.PN P4021568-01 cap, protective
- 3.PN P4021658-04 cap, protective
- 4.PN P12761 plug, protective
- 5.PN P12771 plug, protective
- 6.PN P4021568-03 cap, protective
- 7.PN P4070544 cover
- 8.PN P4021572-01 plug, protective
- 9.PN P4021568-02 cap, protective
- 10.PN P4021572-02 plug, protective
- 11.PN MS3367-5-9 strap, tiedown
- 12.PN P31100 plug, protective
- 13.PN P10547 cap, protective

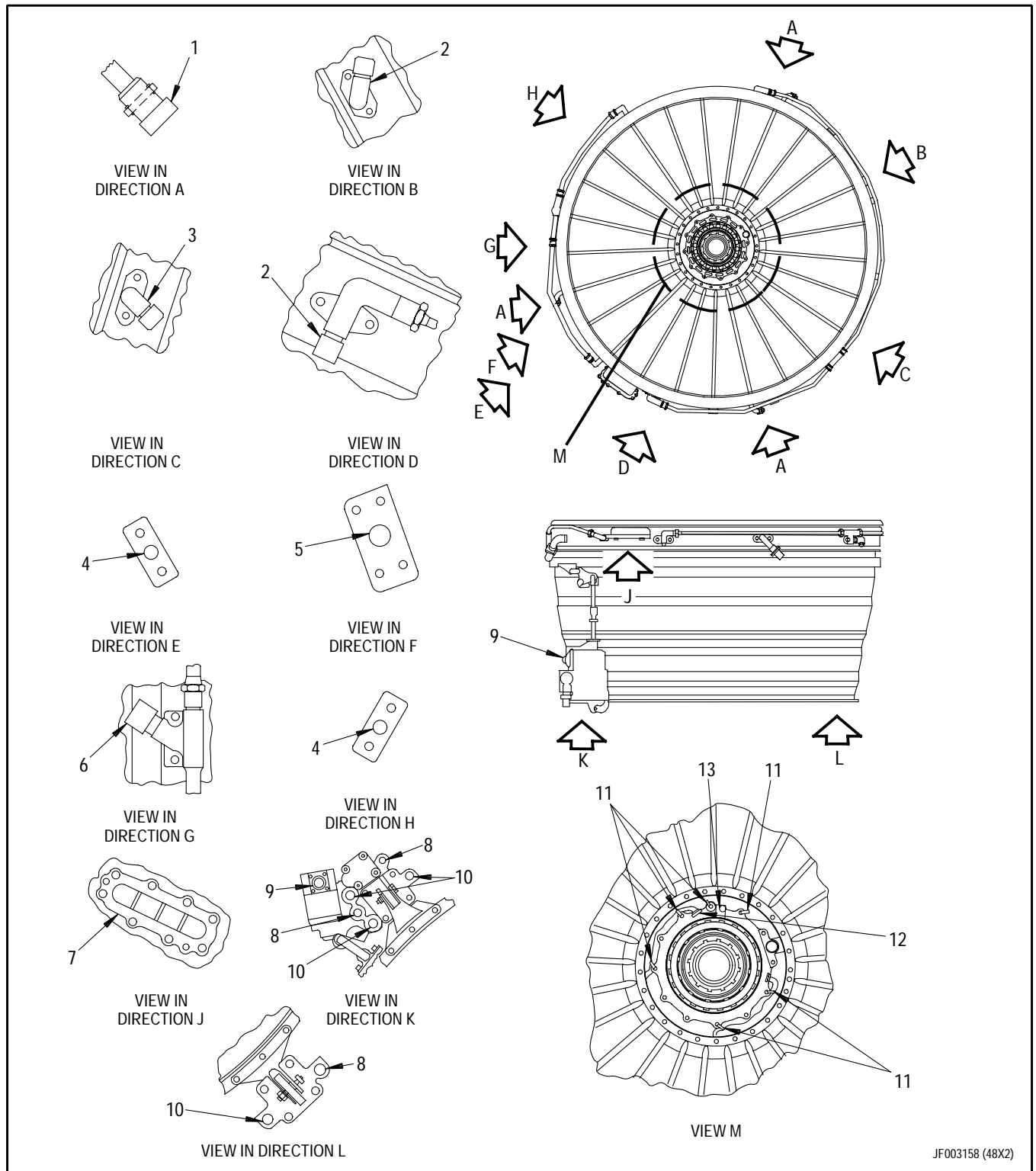


Figure 1. Inlet/Fan Module - Shipping Closures

(11) Remove desiccant access port cover(15). Remove spacer(19) from tierod(12) and place it into desiccant port for storage.

(12) Verify sleeve(27) is installed over base of tierod(12).

NOTE

Packaging items such as desiccant, lockwire, lead seals, etc., are available in PN P4078921 consumable packaging parts.

b. Remove old desiccant, clean interior of container, and check flange seal and mating surfaces for conditions which could cause leakage. Correct if necessary.

NOTE

- Use of PWA 50993 spacer to elevate fan inlet case assembly is optional and may be used for ease of maintenance.
 - Inlet/fan module with PWA 57803 front retainer and PWA 57615 rear retainer installed on module is positioned aft end down on PWA 50993 spacer and PWA 56338 stand.
- c. Install plugs, caps, cover, and straps (if required) on module per figure 1.
- d. Remove PWA 57615 rear retainer from module as follows:
- (1) Remove bolts(14, figure 2) securing inlet/fan module rear flange to retainer.
 - (2) Loosen nuts(12) and unlock locking legs(11). Ensure dowel pins(13) are facing inward at inner-detail(10) location.

(3) Ensure PWA 57614 front retainer is properly secured to inlet/fan module.

(4) Lift module(7) from rear retainer and stand using hoist, PWA 2388 hook, PWA 56336 sling, and two PWA 26147 adapters on spools of PWA 57803 front retainer.

e. Position clamps(14, figures 3 and 4) to outward position.

f. For P4070553 shipping container, carefully lower module onto base(16, figure 3) aligning dowel pin hole in inlet/fan module rear flange with dowel pin in base(16).

g. For P4078842 shipping container, carefully lower module onto adapter ring segments(20, figure 4) aligning dowel pin hole in inlet/fan module rear flange with arrow marked HOLE NO 1 on inside of adapter ring segments.

h. Carefully position clamps(14, figures 3 and 4) over inlet/fan module(11) rear flange, while maintaining clamp alignment.

Legend for figure 2

- | | |
|---------------------|---------------------|
| 1. Nut Detail | 8. Shaft Detail |
| 2. Base Detail | 9. Drum Rotor Shaft |
| 3. Bolt | 10. Inner Detail |
| 4. Ball Lock Pin | 11. Locking Leg |
| 5. Slide Jaw Detail | 12. Nut |
| 6. Slot | 13. Dowel Pin |
| 7. Inlet/Fan Module | 14. Bolt |

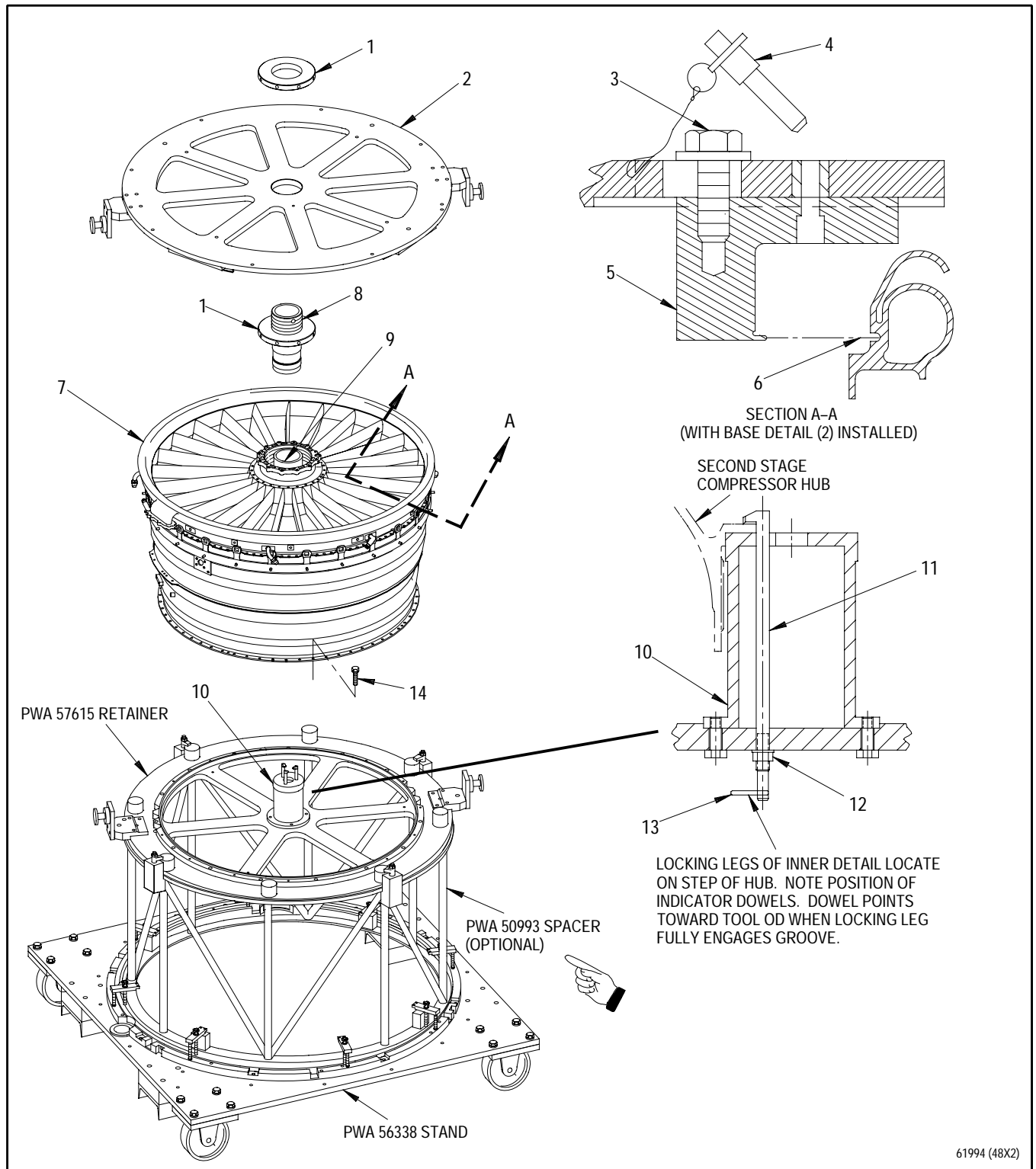


Figure 2. Inlet/Fan Module - Removal From PWA 57615 Retainer

i. Hand tighten knobs(13) until clamp rest comes in contact with rear flange. Hold clamp(14) against module rear flange, maintain clamp alignment and turn knobs(13) an additional 1/4 turn. Lock knobs into position by swinging retainer springs(17) over knobs.

j. Remove PWA 57614 front retainer from module as follows:

- (1) Loosen upper nut detail(1, figure 2) from shaft detail(8).
- (2) Remove ball lock pins(4) and bolts(3).
- (3) Position slide jaws(5) inward.
- (4) Ensure all slide jaws are unlocked from slot(6). Tighten bolts(3) to secure slide jaws in unlocked position.
- (5) Using overhead hoist, PWA 26147 adapters, PWA 56336 sling, and PWA 2388 hook, lift base(2) and remove from module.
- (6) Remove shaft detail(8) from drum rotor shaft(9) and assemble into base(2). Secure with upper nut(1).
- (7) Lower front retainer onto storage stand and remove tooling.

k. For P4070553 shipping container, proceed as follows: (See figure 3.)

- (1) Install tierod(12, figure 3) into base(16) and hand tighten.
- (2) Install keyway washer(10) step side down, aligning keyway slot with key on tierod(12).

(3) Install washer(9) and nut(8) onto tierod. Torque nut 475 to 675 pound-inches.

(4) Lockwire nut(8) to tierod(12) using PN MS20995-C41 lockwire. Lockwire keyway washer(10) to dowel pin hole in ID flange of inlet case using PN MS20995-C41 lockwire.

(5) Install cover(7).

l. For P4078842 shipping container, proceed as follows: (See figure 4.)

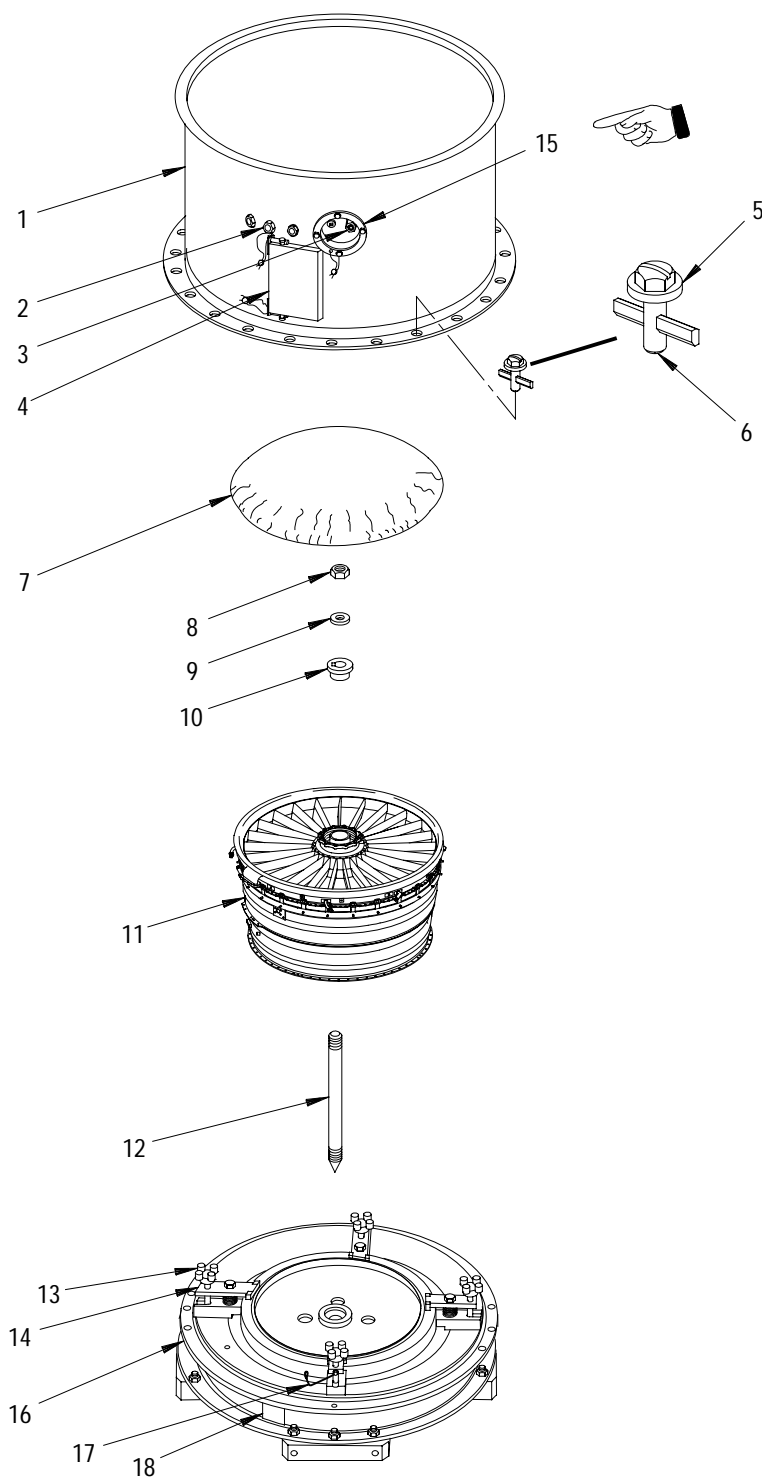
(1) Position keyway washer(10, figure 4) and cover(7) onto tierod(12) and secure with washer(9) and nut(8). Torque nut 475 to 675 pound-inches.

(2) Lockwire nut(8) to dowel pin hole in ID flange of inlet case using PN MS20995-C41 lockwire.

m. Replace humidity indicator(2, figures 3 and 4) or return serviceable indicator to usable condition by drying. Use hand held dryer until blue color of indicator is restored. Do not concentrate heat of dryer.

Legend for figure 3

- | | |
|------------------------------|---------------------------------|
| 1. Cover | 10. Keyway washer |
| 2. Humidity indicator | 11. Inlet/fan module |
| 3. Air pressure relief valve | 12. Tierod |
| 4. Record receptacle | 13. Knob |
| 5. Adjusting screw | 14. Clamp |
| 6. Turnlock fastener | 15. Desiccant access port cover |
| 7. Cover | 16. Base |
| 8. Nut | 17. Retainer spring |
| 9. Washer | 18. Identification plate |



104559 (48X2)

Figure 3. Inlet/Fan Module - Installation Into Shipping Container (P4070553)

- ml. Install humidity indicator(2) into cover(1).
- n. Place four bags of P8320 desiccant into basket of container and install desiccant access port cover(15).
- o. Install condition tag on inlet/fan module.
- p. Inspect container interior for cleanness and inlet/fan for security.
- q. Use PWA 56336 sling and hoist to install cover(1). Secure by turning turnlock fasteners(6) 1/4 turn clockwise.
- r. Torque adjusting screws(5) 50 to 100 pound-inches using 3/16 hex key in a sequence that moves from quadrant to quadrant.
- s. Place all shipping paperwork, in record receptacle(4). Seal record receptacle with PN MS20995-C41 lockwire and PN 83280 lead seal in two places.
- t. Seal access port cover(15) with PN MS20995-C41 lockwire and PN 83280 lead seal.
- u. If container needs to be marked, print module name on outside of container in one inch high block letters.
- v. When container contents (module) is new or repaired, perform container pneumatic pressure test as follows:
 - (1) Remove container 1/8 NPT plug from desiccant access port cover. Install PN 645A-6 valve in hole and introduce supply of air. Test pressure shall be sufficient to overcome pressure relief valve(3) setting.
 - (2) After relief valve opens, stop source of air pressure allowing container pressure to drop and relief valve to close.
 - (3) Check container flange for leakage. If leakage exists, tighten adjusting screw at each turn lock fastener location using 3/16 hex key to a maximum of 100 pound-inches.
 - (4) Remove air source line and install container 1/8 NPT plug.
- w. Sealed containers may be shipped with no internal pressure.

Legend for figure 4

- | | |
|------------------------------|---------------------------------|
| 1. Cover | 15. Desiccant access port cover |
| 2. Humidity indicator | 16. Base |
| 3. Air pressure relief valve | 17. Retainer spring |
| 4. Record receptacle | 18. Identification plate |
| 5. Adjusting screw | 19. Spacer |
| 6. Turnlock fastener | 20. Adapter ring segments |
| 7. P4078969 cover | 21. P4078934-01 ring spacer |
| 8. Nut | 22. P4078934-02 ring spacer |
| 9. Washer | 23. P4078934-03 ring spacer |
| 10. Keyway washer | 24. P4078935 ring spacer |
| 11. Inlet/fan module | 25. P4078936 ring spacer |
| 12. Tierod | 26. Storage ring |
| 13. Knob | 27. Sleeve |
| 14. Clamp | |

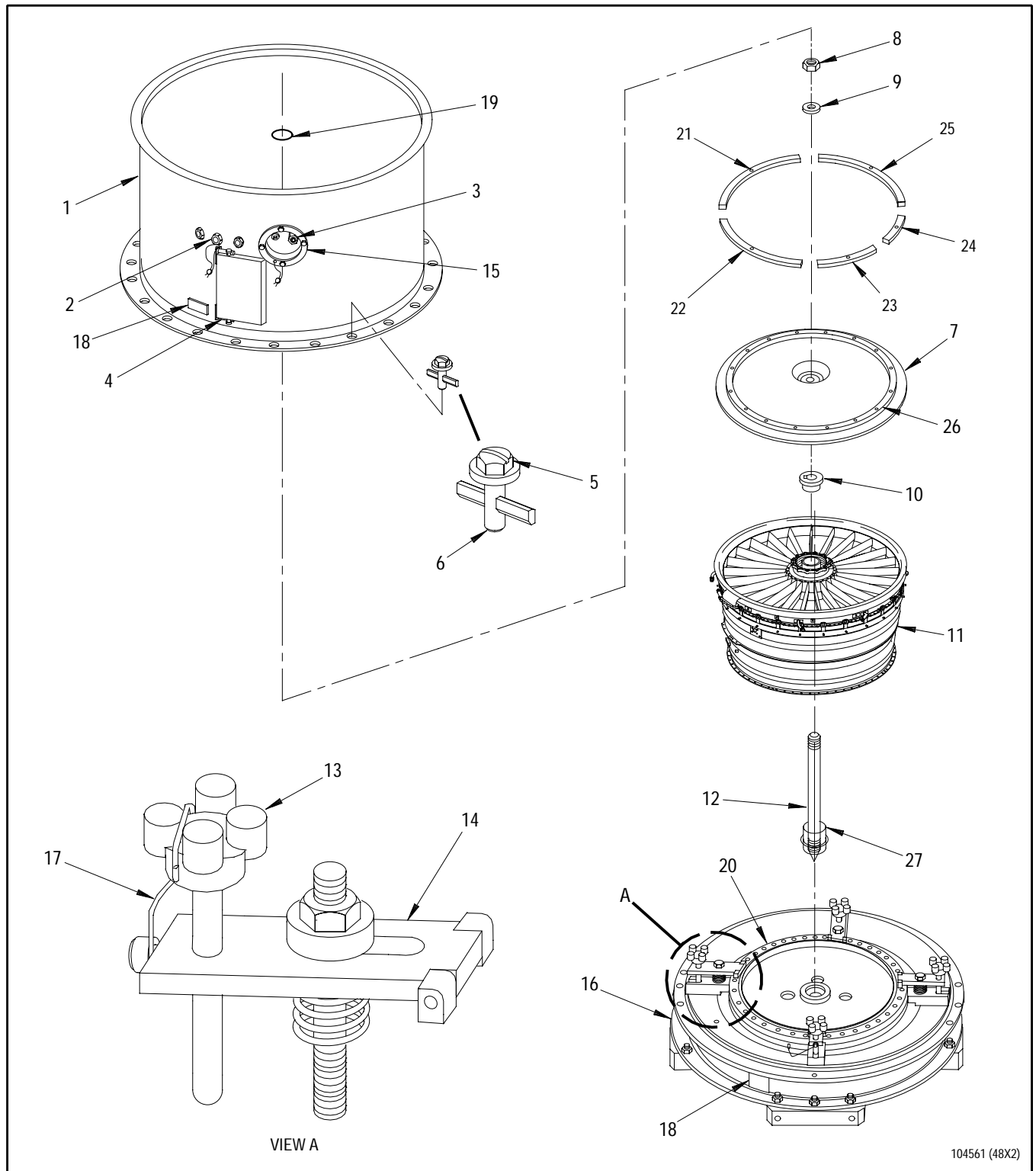


Figure 4. Inlet/Fan Module - Installation Into Shipping Container (P4078842)

**3. INLET/FAN MODULE - CONTAINER
IDENTIFICATION PLATE REPLACEMENT.**

(See figures 3 and 4.)

- a. Remove damaged identification plate(s)(18) from container.
- b. Clean identification plate area with methyl ethyl ketone (MEK) TT-M-261.
- c. Mark each identification plate as follows:

CONTAINER: SHIPPING AND
STORAGE, METAL REUSABLE

FOR PACKING: INLET/FAN MODULE

SPEC: MIL-C-5584, MFRR'S. PART
NO. (P4070553 or P4078842)

MODEL NO: F100

- d. Peel protective backing sheet off identification plate exposing adhesive surface. Do not handle adhesive surface. Locate plates in designated areas. Press firmly over complete area.

WORK PACKAGE

INTRODUCTION

INLET/FAN MODULE -

DISMANTLING

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2					0

1. INTRODUCTION.

- a. Dismantling Series Work Packages. This work package introduces dismantling series work packages for Inlet/Fan Module. Work package numbers 010 00 through 019 00 are reserved for this grouping.
- b. Module Dismantling. Modular parts which must be removed from front of module are designated as module front section parts. Parts which must be removed from rear are designated as rear section parts. Either section, front or rear, can be dismantled first. The following is a summary of dismantling capabilities in module front and rear sections.

- (1) Front Section Dismantling.
Area from fan inlet case through third stage compressor rotor blade. Dismantling is vertical with module in a rear down position in disassembly/assembly stand.

- (2) Rear Section Dismantling.
Third stage compressor rotor blades only can be removed. Dismantling is vertical with module in a front down position in disassembly/assembly stand.

WP No.	Title
011 00	External Parts, Inlet/Fan Module; Blades, Compressor Rotor, Third Stage - Removal
012 00	Inlet/Fan Module (Front Section) - Dismantling
013 00	Blades, Compressor Rotor, First and Second Stages - Removal
014 00	Open
015 00	Inlet/Fan Module - Service Cycle Marking
016 00	Open
through 019 00	

WORK PACKAGE**TECHNICAL PROCEDURES**

**EXTERNAL PARTS, INLET/FAN MODULE;
BLADES, COMPRESSOR ROTOR, THIRD STAGE -**

REMOVAL

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 18

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	30	9	4	14	23
3	23	10	0	15	15
4 - 5	7	11	4	16	13
6	0	12	22	17	15
7	13	13	0	18	0
8	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Inlet/Fan Module - - - - -	T.O. 2J-F100-53-6
Inlet/Fan Module - Service Cycle Marking - - - - -	WP 015 00
Ring Assembly - Synchronizing, Front Compressor Stator, Inlet; and Lever Arm Assembly, Compressor Stator Linkage - Inspection - - - - -	WP 308 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

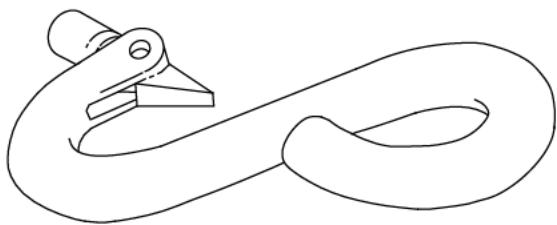
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

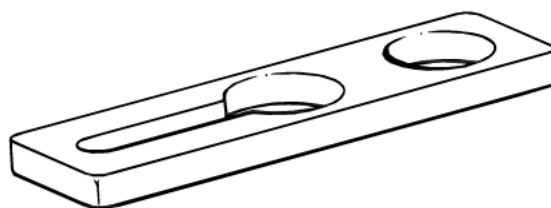
Paragraph	Function - Tool Nomenclature	Tool Number
5	COMPRESSOR INLET VARIABLE VANE CONTROL AND CYLINDER - REMOVAL	
	HOOK, SAFETY - - - - -	PWA 2388
	SLING, HANDLING - - - - -	PWA 56336
	ADAPTER, LIFT AND TRUNNION (TWO REQUIRED) - - - - -	PWA 26147
8	THIRD STAGE COMPRESSOR ROTOR BLADES - REMOVAL	
	FIXTURE, HOLDING, 3RD STAGE FAN - - - - -	PWA 71459
9	INLET/FAN MODULE - POSITIONING TO FRONT END UP POSITION	
	RETAINER, INLET/FAN MODULE, HANDLING, REAR - - - - -	PWA 57615
	ADAPTER, LIFT AND TRUNNION (FOUR REQUIRED) - - - - -	PWA 26147
	SLING, HANDLING (TWO REQUIRED) - - - - -	PWA 56336
	HOOK, SAFETY (TWO REQUIRED) - - - - -	PWA 2388

ILLUSTRATED SUPPORT EQUIPMENT



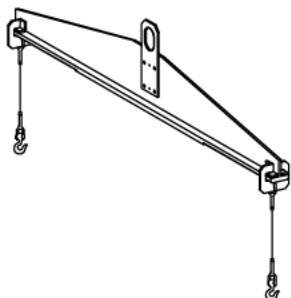
PWA 2388 -C

Figure T1. PWA 2388 HOOK



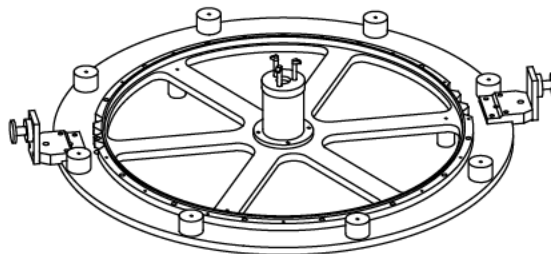
PWA 26147 -C

Figure T2. PWA 26147 ADAPTER



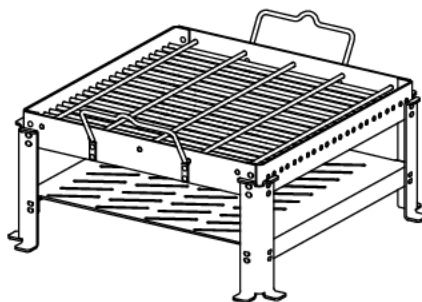
PWA 56336 -C

Figure T3. PWA 56336 SLING



PWA 57615 -C

Figure T4. PWA 57615 RETAINER



PWA 71459 -C

Figure T5. PWA 71459 FIXTURE

1. INTRODUCTION.

- a. This work package contains instructions for removal of inlet/fan module external parts and 3rd stage compressor rotor blades. External parts include the No. 1 bearing scavenge tube assemblies, Ps2 air tube assemblies, compressor inlet variable vane control and cylinder, borescope plug, compressor inlet variable vane linear actuating cylinder, front compressor stator inlet synchronizing ring, and compressor inlet variable vane linkage system.

2. PRELIMINARY INSTRUCTIONS.

- a. Remove inlet/fan module from engine per T.O. 2J-F100-53-5, WP 201 00.

3. NO. 1 BEARING SCAVENGE TUBE ASSEMBLIES - REMOVAL.

(See Figure 1.)



Failure to hold mating tube case fittings with one wrench while turning tube coupling nuts with second wrench may result in tube damage.

- a. Disconnect tube coupling nuts(8, figure 1) while holding mating case fittings(7) with another wrench, and remove tubes(9).

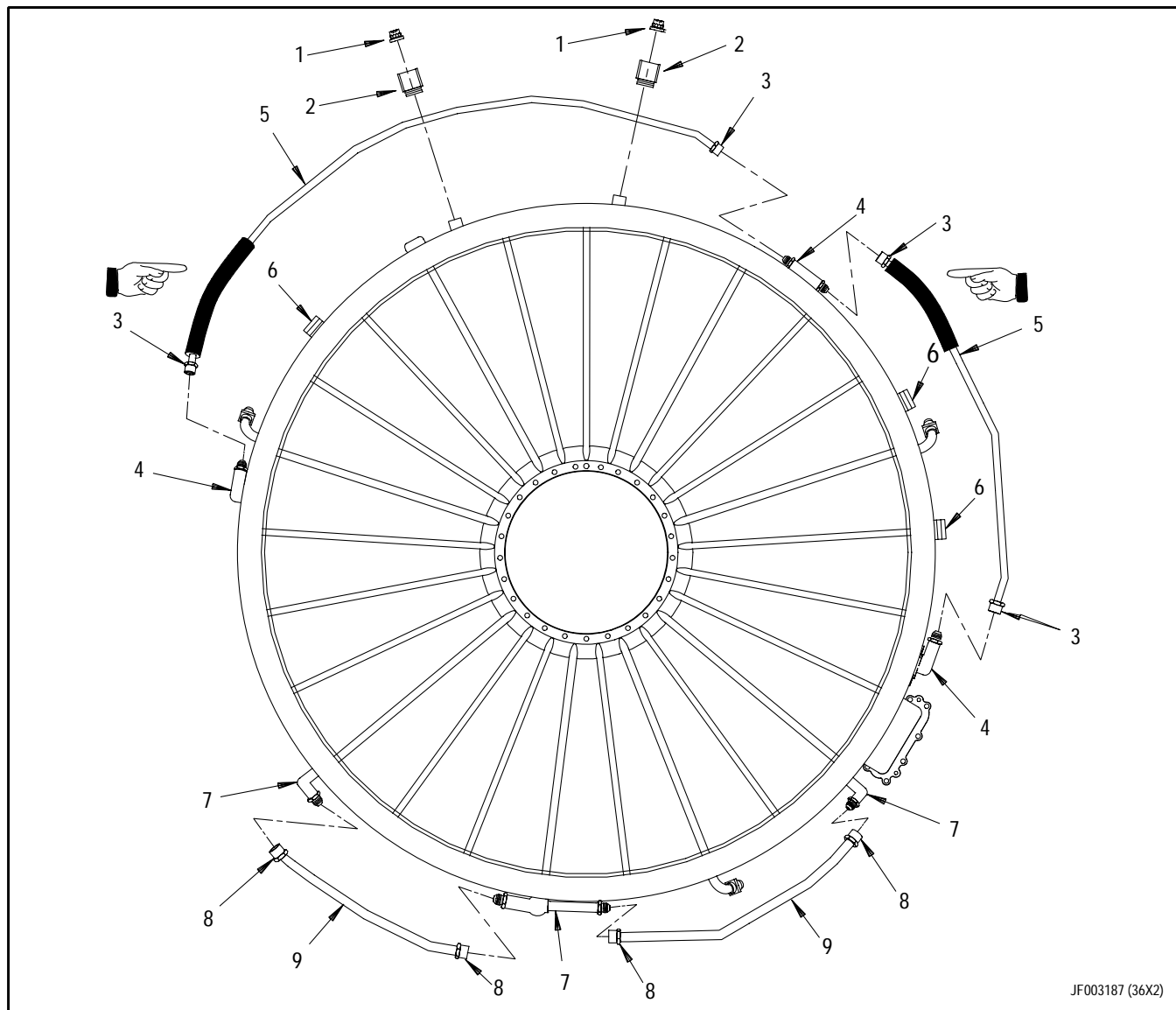
- b. Install protective closures on tube coupling nuts(8) and fan inlet case fittings(7).

4. Ps2 AIR TUBE ASSEMBLIES - REMOVAL.

(See figure 1.)



- Failure to remove safety wire with all clamping in place may result in tube damage.
 - Failure to hold mating tube case fittings with one wrench while turning tube coupling nuts with second wrench may result in tube damage.
- a. Disconnect tube coupling nuts(3, figure 1) while holding mating case fittings(4) with another wrench.
 - c. Remove nuts(1) and loop clamps(2).
 - d. Disengage upper half of block clamps(6) securing Ps2 tubes(5)/flexible hoses(5) to fan inlet case and remove tubes/flexible hoses(5).
 - e. Install protective closures on tube coupling nuts(3) and fan inlet case fittings(4).



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- | | |
|---------------------------|---------------------------|
| 1. Nut | 6. Block Clamp |
| 2. Loop Clamp | 7. Fan Inlet Case Fitting |
| 3. Tube Coupling Nut | 8. Tube Coupling Nut |
| 4. Fan Inlet Case Fitting | 9. Scavenge Tube |
| 5. Ps2 Tube* | |

*PNs 4081114-01 and 4081099-01 nickel-base tubes are partially non-metallic (flexible). PNs 4071695-01 and 4071694-01 stainless steel tubes are completely rigid.

Figure 1. No. 1 Bearing Scavenge Tube Assemblies, and Ps2 Air Tube Assemblies - Removal

5. COMPRESSOR INLET VARIABLE VANE CONTROL AND CYLINDER - REMOVAL.

(See Figures 2 and 3.)

- a. Remove PWA 57615 rear retainer as follows:

NOTE

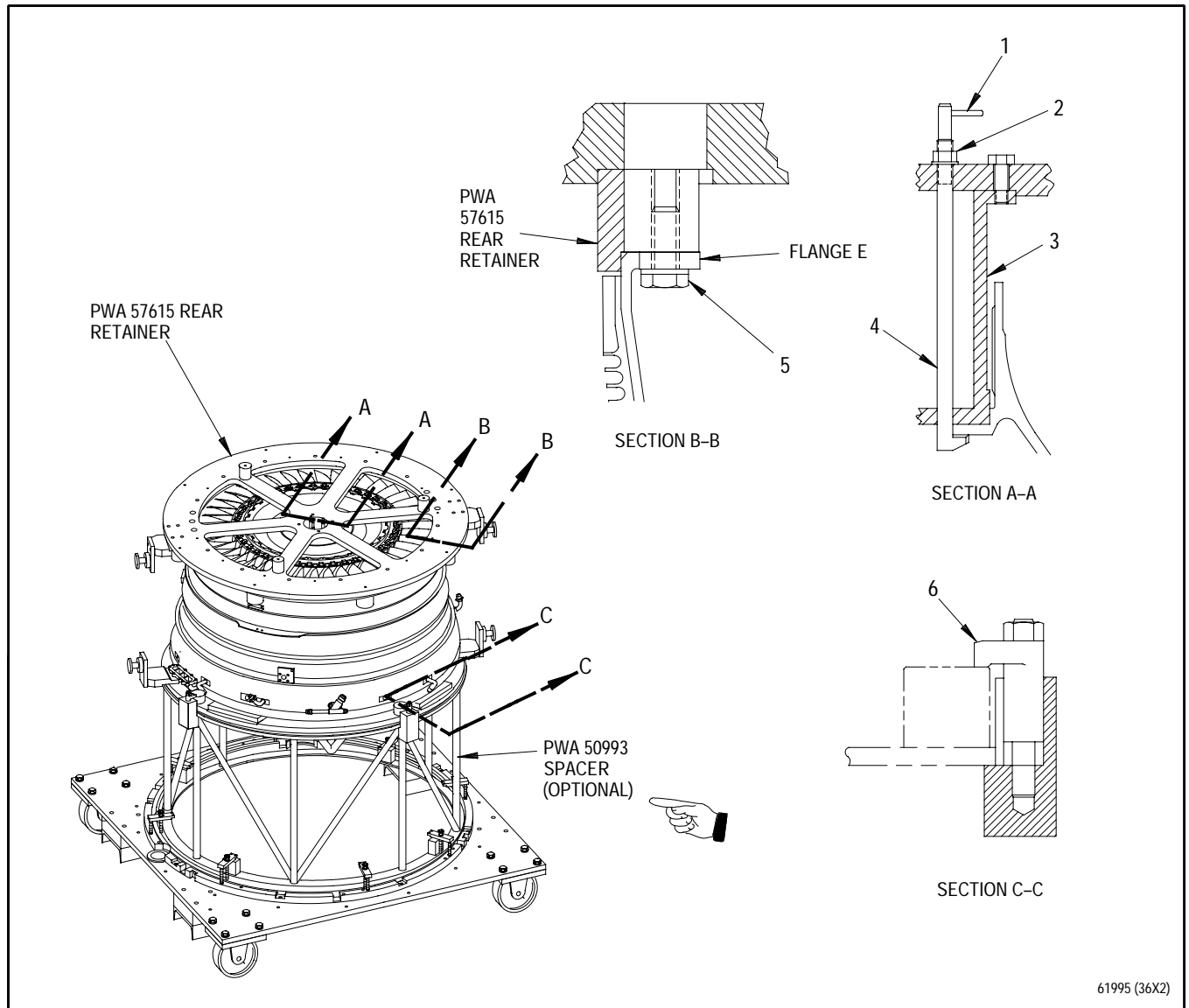
Dowel pins(1) indicate position of locking legs(4).

- (1) Loosen nuts(2, figure 2) securing PWA 57615 retainer detail-25 locking legs(4) of detail-24 locator(3) and turn detail-25 locking legs(4) inward.
 - (2) Remove cap screw assemblies(5) securing retainer to inlet/fan module.
 - (3) Using overhead hoist, PWA 2388 hook, PWA 56336 sling, and PWA 26147 adapters, lift and remove retainer.
- b. Remove cotter pin(12, figure 3), retainer(11), and clevis pin(9) securing rod end clevis(13) to bell crank assembly(10). Discard cotter pin.
 - c. Place container under compressor inlet variable vane control and cylinder(7) to capture fuel.
 - d. Remove protective cap from control and cylinder fuel retract port.

WARNING

Jet fuel may be expelled from control and cylinder when cylinder rod is moved.

- e. Push cylinder rod into control and cylinder(7) until clevis(13) clears bell crank assembly(10).
- f. Remove nut(15) and bolt(21) securing control and cylinder(7) to connecting link(16).
- g. Remove cotter pin(4), nut(5), and bolt(3). Remove control and cylinder(7). Discard cotter pin.
- h. Remove clevis(13), sleeve nut(14), and keywasher(8) from control and cylinder(7). Discard keywasher(8) and install protective closure on fuel retract port.
- i. Remove nut(17), bolt(20), and connecting link(16).
- j. Remove screws(2), nuts(22), bolts(6), and support assembly(23).
- k. Remove bolts(19), and bracket assembly(18).
- l. Remove borescope plug(1).



1. Dowel Pin
2. Nut
3. Inner Detail
4. Locking Leg
5. Cap Screw Assembly
6. Clamp

Figure 2. Removal Of PWA 57615 Rear Retainer

Legend for figure 3

1. Borescope plug
2. Screw
3. Bolt
4. Cotter pin
5. Nut
6. Bolt
7. Control and cylinder
8. Key washer
9. Clevis pin
10. Bell crank assembly
11. Retainer
12. Cotter pin
13. Rod end clevis
14. Sleeve nut
15. Nut
16. Connecting link
17. Nut
18. Bracket assembly
19. Bolt
20. Bolt
21. Bolt
22. Nut
23. Support assembly

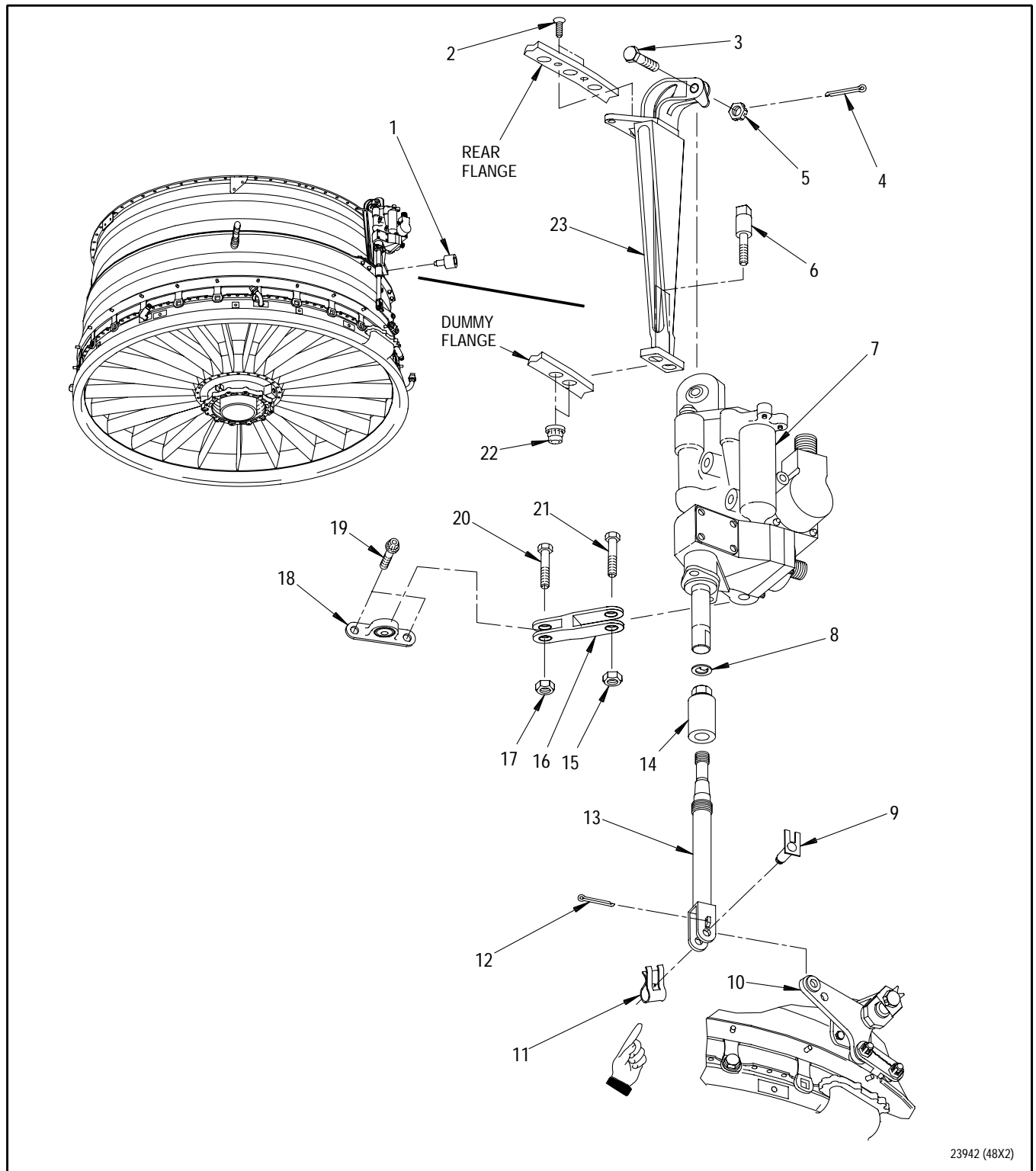


Figure 3. Compressor Inlet Variable Vane Control and Cylinder - Removal

6. COMPRESSOR INLET VARIABLE VANE LINEAR ACTUATING CYLINDER - REMOVAL.

(See Figure 4.)

- a. Remove cotter pin(9, figure 4), retainer(8), and clevis pin(6) securing rod end clevis(10) to bell crank assembly(7). Discard cotter pin.
- b. Place container under compressor inlet variable vane linear actuating cylinder(5) to retain fuel.
- c. Remove protective cap from control and cylinder fuel retract port.

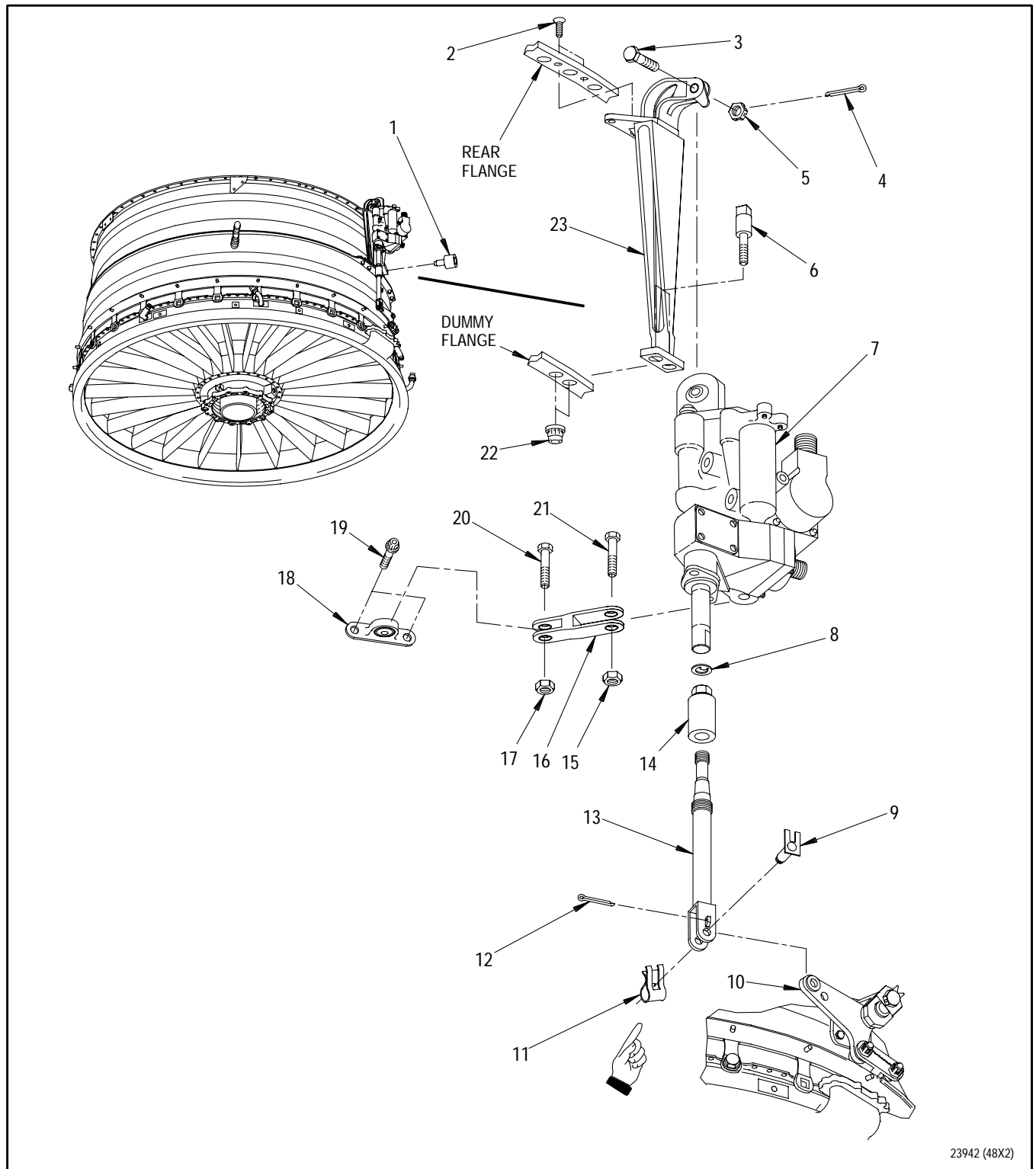
WARNING

Jet fuel may be expelled from linear actuating cylinder when cylinder rod is moved.

- d. Push cylinder rod into linear actuating cylinder(5) until clevis(10) clears bell crank assembly(7).
- e. Remove cotter pin(1), nut(15), and bolt(3). Remove linear actuating cylinder(5). Discard cotter pin.
- f. Remove clevis(10), sleeve nut(11), and key washer(12) from linear actuating cylinder(5). Discard key washer(12) and install protective cap on fuel retract port.
- g. If required, remove screws(2), bolts(14), nuts(4), and support assembly(13).

Legend for figure 4

1. Cotter pin
2. Screw
3. Bolt
4. Nut
5. Linear actuating cylinder
6. Clevis pin
7. Bell crank assembly
8. Retainer
9. Cotter pin
10. Rod end clevis
11. Sleeve nut
12. Key washer
13. Support assembly
14. Bolt
15. Nut



23942 (48X2)

Figure 4. Compressor Inlet Variable Vane Linear Actuating Cylinder - Removal

**7. FRONT COMPRESSOR STATOR INLET
SYNCHRONIZING RING AND COMPRESSOR
INLET VARIABLE VANE LINKAGE SYSTEM -
REMOVAL.**

(See Figure 5.)

- a. If necessary, remove compressor inlet variable vane control and cylinder per paragraph 5.
- b. If necessary, remove compressor inlet variable vane linear actuating cylinder per paragraph 6.
- c. If required, remove bolts securing Ps2 tube elbow located at 11:00 o'clock position, to allow removal of synchronizing ring lever arm at that location.
- d. Remove bolts(1, figure 5) and washers(2) from lever arms(3).
- e. Lift and position lever arms(3) to right or left of variable vane attachment points.

NOTE

Procedure for disengaging bell crank assemblies and removing bell crank supports applies to both sides of engine.

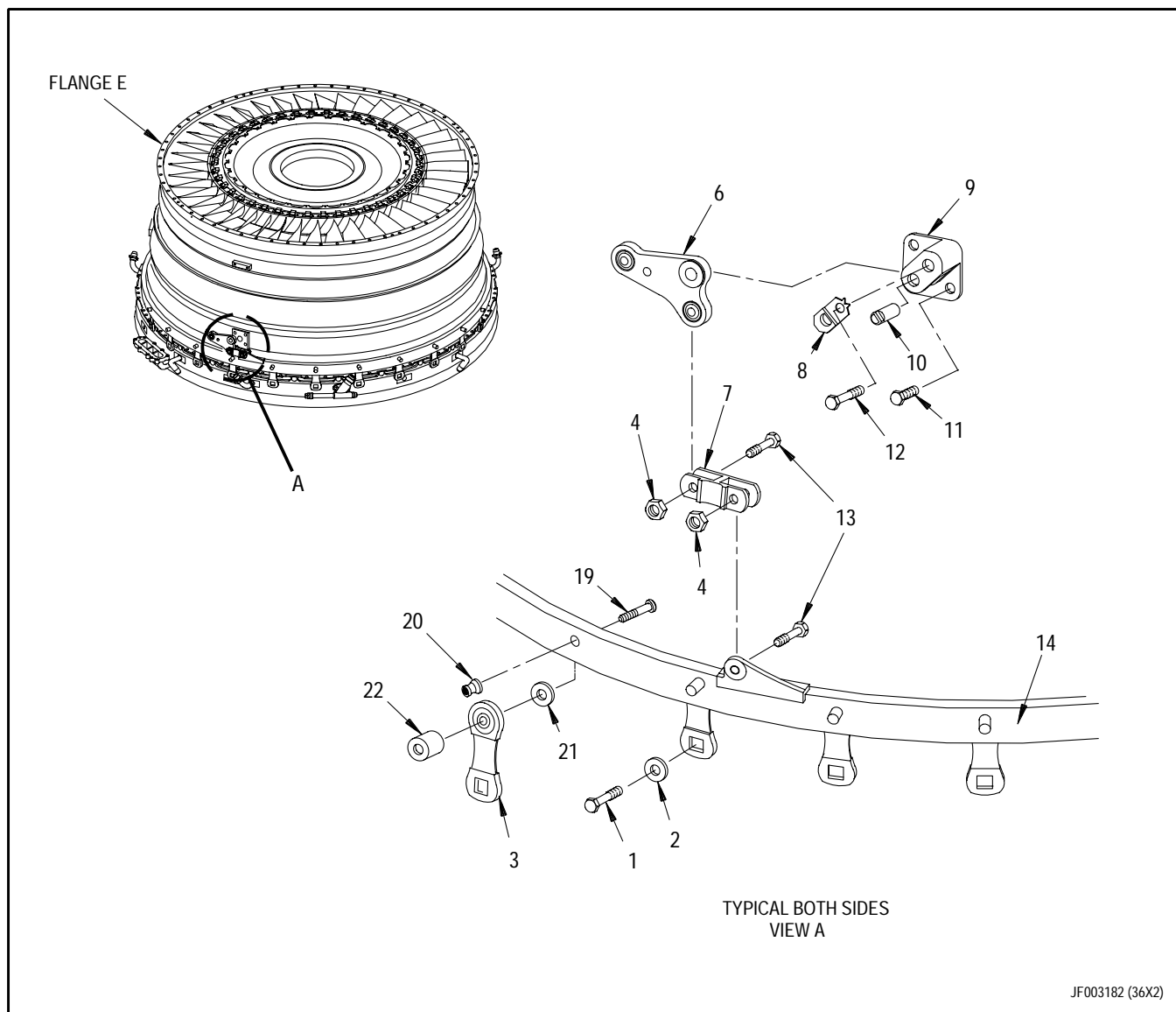
- f. Remove bolts(12), key washers(8), and shoulder pins(10) from bell crank supports(9). Discard key washers.

- g. Rotate synchronizing ring(14) to disengage bell crank assemblies(6) from bell crank supports(9).
- h. Remove bolts(11) and bell crank supports(9).
- i. Loosely reinstall bolts to secure Ps2 tube elbow to fan inlet case.

NOTE

Two mechanics are required to maneuver synchronizing ring to clear bosses on fan case.

- j. Slide synchronizing ring(14, figure 5) towards rear of module until ring clears Flange E.
- k. Place ring(14) on suitable bench or equivalent and inspect per WP 308 00.
- l. Remove lockwire and remove nuts(4) and bolts(13). Remove bell crank assemblies(6) and connecting links(7).
- m. Deleted.



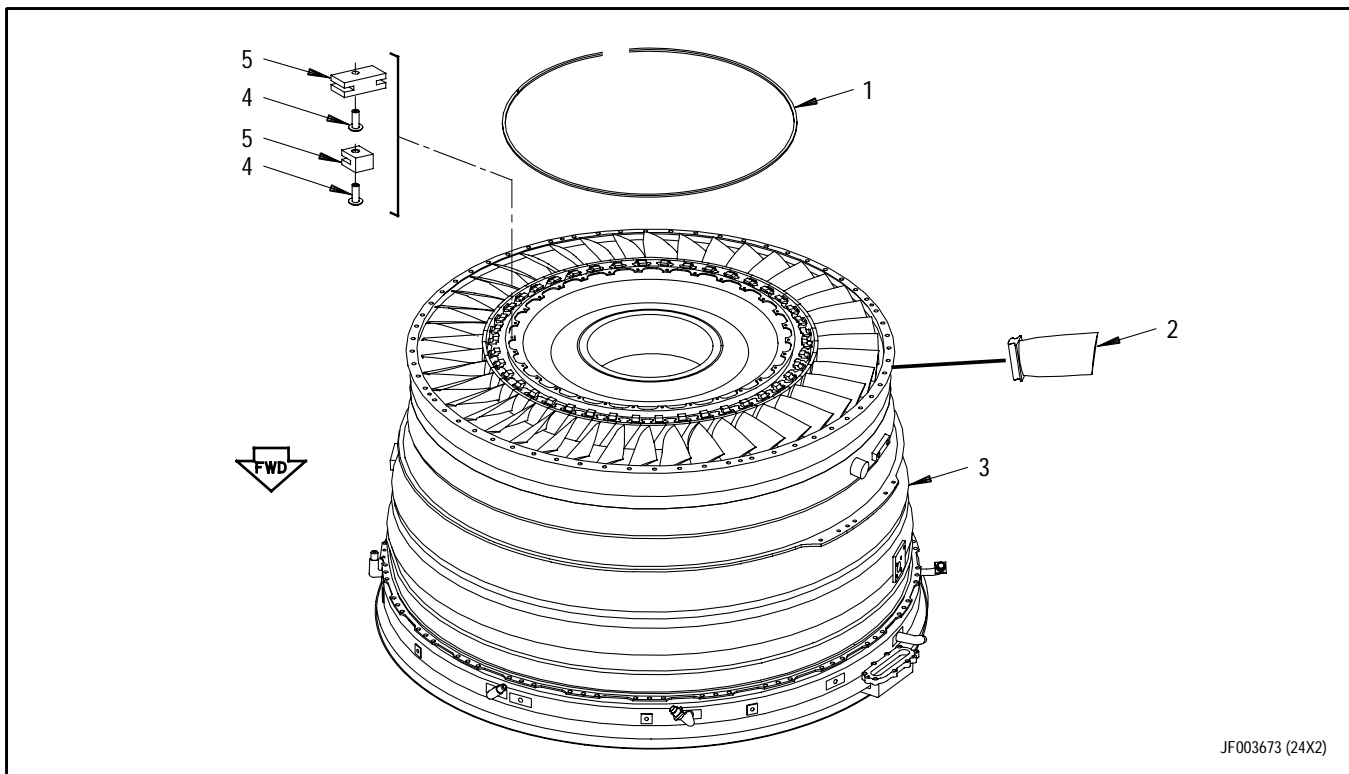
- | | |
|------------------------|------------------------|
| 1. Bolt | 12. Bolt |
| 2. Washer | 13. Bolt |
| 3. Lever arm | 14. Synchronizing ring |
| 4. Nut | 15. Deleted |
| 5. Deleted | 16. Deleted |
| 6. Bell crank assembly | 17. Deleted |
| 7. Key washer | 18. Deleted |
| 8. Connecting link | 19. Pin |
| 9. Bell crank support | 20. Collar |
| 10. Shoulder pin | 21. Washer |
| 11. Bolt | 22. Spacer |

Figure 5. Front Compressor Stator Inlet Synchronizing Ring and Compressor Inlet Variable Vane Linkage System - Removal

8. THIRD STAGE COMPRESSOR ROTOR BLADES - REMOVAL.

(See Figure 6.)

- a. Establish and mark a No. 1 disk slot location on drum rotor. Number 3rd stage compressor blades(2, figure 6) in a counterclockwise direction starting with No. 1 disk slot location.
- b. Remove 3rd stage compressor blade lock ring(1) from drum rotor.
- c. Remove blades(2) in a counterclockwise direction and place into PWA 71459 fixture, blade root up.
- d. Mark total low cycle fatigue cycles on all removed blades per WP 015 00.
- e. Remove all counterweights(5) from disk by machining flare of retaining rivet(4). Drift out rivet.



1. Third Stage Compressor Blade Lock Ring
2. Third Stage Compressor Rotor Blade
3. Inlet/Fan Module
4. Rivet
5. Counterweight

Figure 6. Third Stage Compressor Rotor Blades - Removal

9. INLET/FAN MODULE - POSITIONING TO FRONT END UP POSITION.

(See Figure 7.)

NOTE

This procedure rotates inlet/fan module from rear end up to front end up position.

- a. Install PWA 57615 rear retainer as follows:

NOTE

Dowel pins(1, figure 7, Sheet 1) indicate position of locking legs(4).

- (1) Position locking legs(4) inward to prevent interference with drum rotor.
- (2) Lower inner detail(3) into rear of drum rotor assembly. Align dowel pin on base detail with dowel pin hole in inlet/fan module. Secure base detail by turning detail-25 locking leg(4) outward. Tighten nuts(2) to secure locking legs.
- (3) Secure rear retainer to module using cap screw assemblies detail-6(5).

NOTE

PWA 57803 retainer contains PWA 57614 details.

- b. Attach PWA 26147 lift adapters, PWA 56336 slings, and PWA 2388 hooks onto spools of PWA 57615

rear retainer and PWA 57803 front retainer as shown in figure 7, Sheet 2.

NOTE

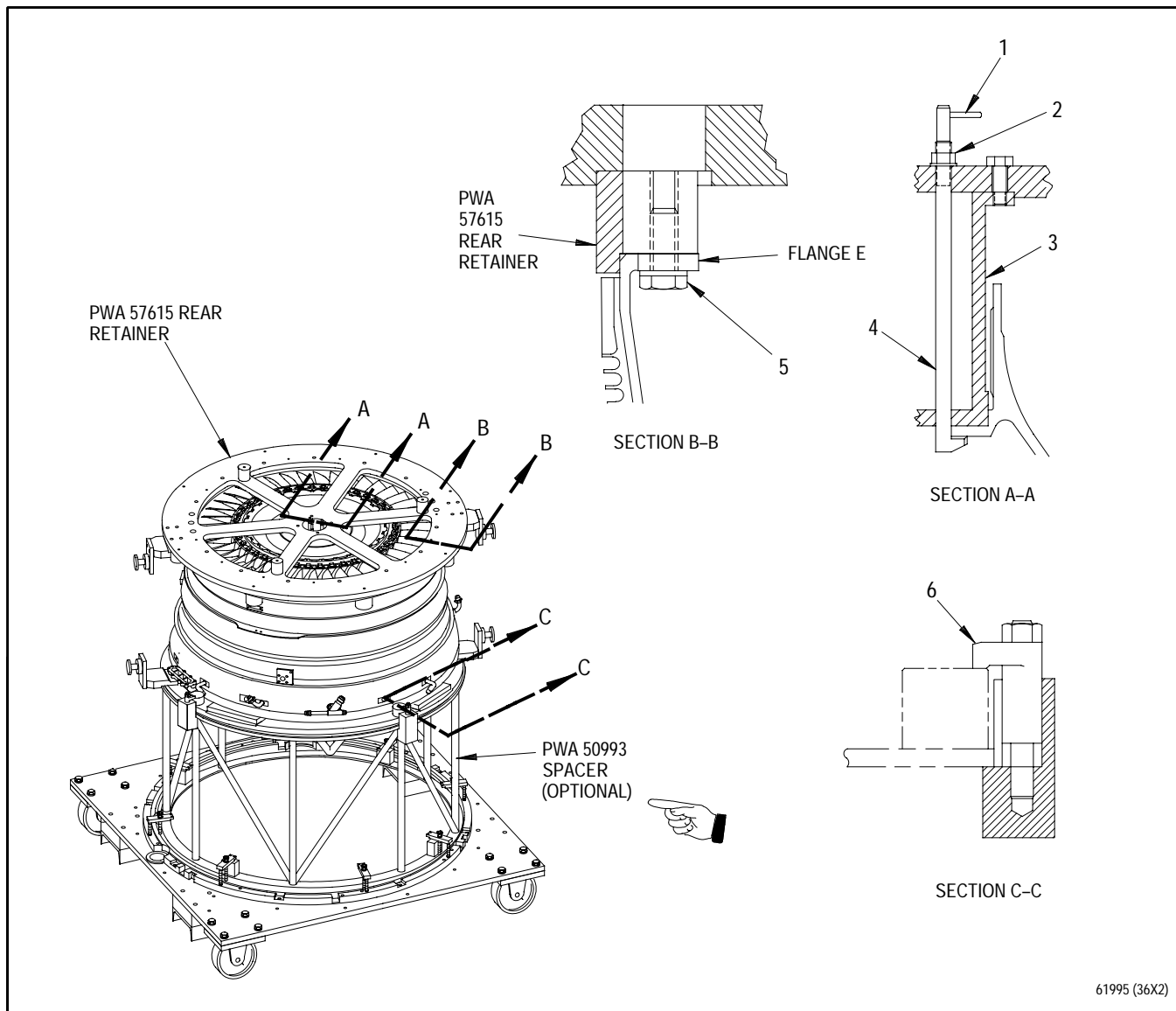
Use of PWA 50993 module support stand spacer to elevate fan inlet case assembly is optional and may be utilized for ease of maintenance.

- c. Loosen clamps (6, figure 7, sheet 1) of PWA 50993 spacer, if installed, and swing clamps to one side.
- d. Using two overhead hoists, carefully lift and rotate inlet/fan module to front end up position.
- e. Remove PWA 50993 spacer from stand.
- f. Remove sling securing rear retainer and lower inlet/fan module onto PWA 56338 stand. Secure using clamps. Remove sling securing front retainer.
- g. Ensure that slide jaw details(5, figure 7, Sheet 3) are positioned inward before attempting to remove PWA 57803 front retainer.

NOTE

Two technicians, 180 degrees apart, are required to lift PWA 57803 front retainer.

- h. Remove PWA 57803 front retainer as shown in figure 7, sheet 2.



1. Dowel Pin
2. Nut
3. Inner Detail
4. Locking Leg
5. Cap Screw Assembly
6. Clamp

Figure 7. Rotating Inlet/Fan Module To Front End Up Position (Sheet 1 of 3)

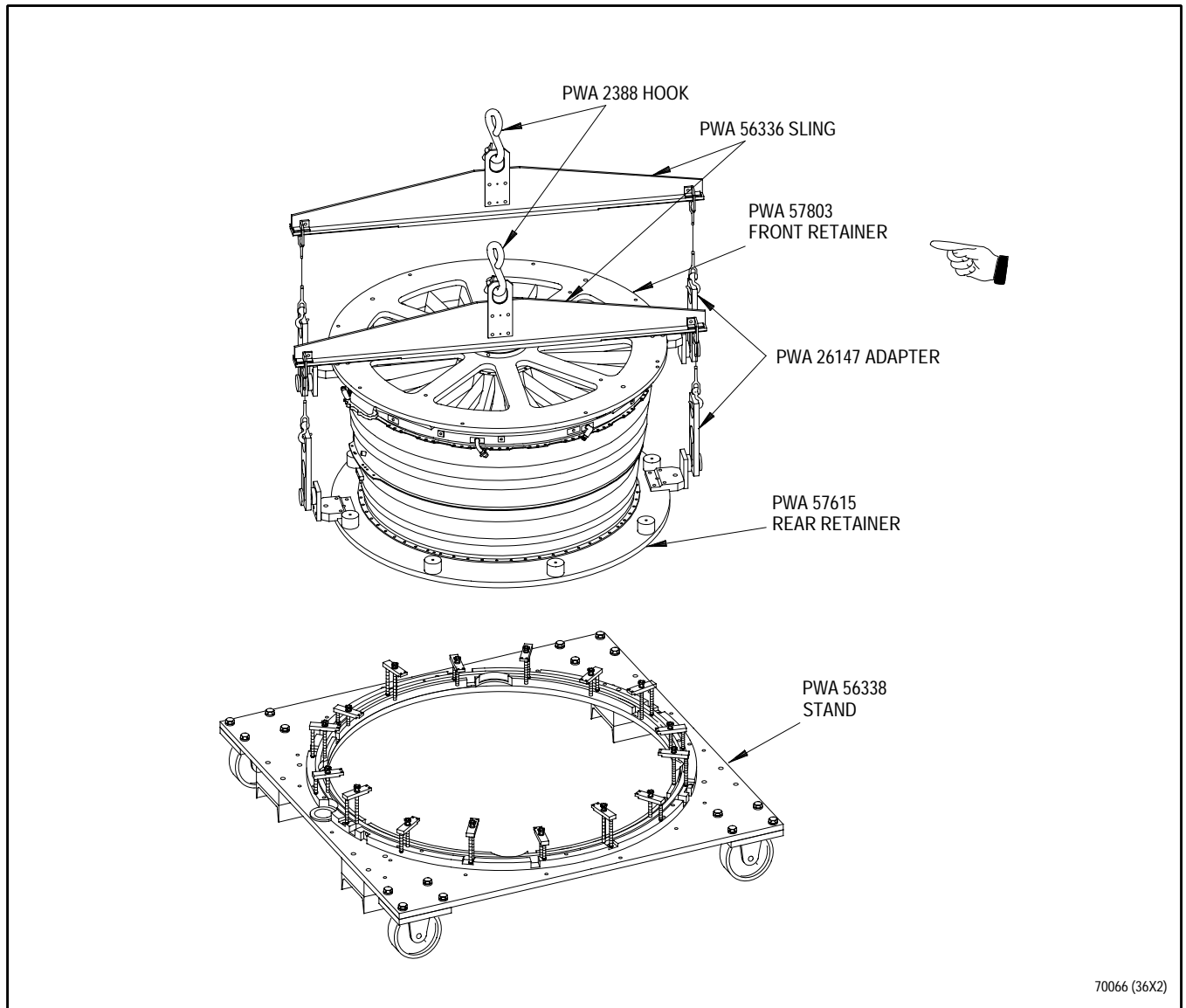
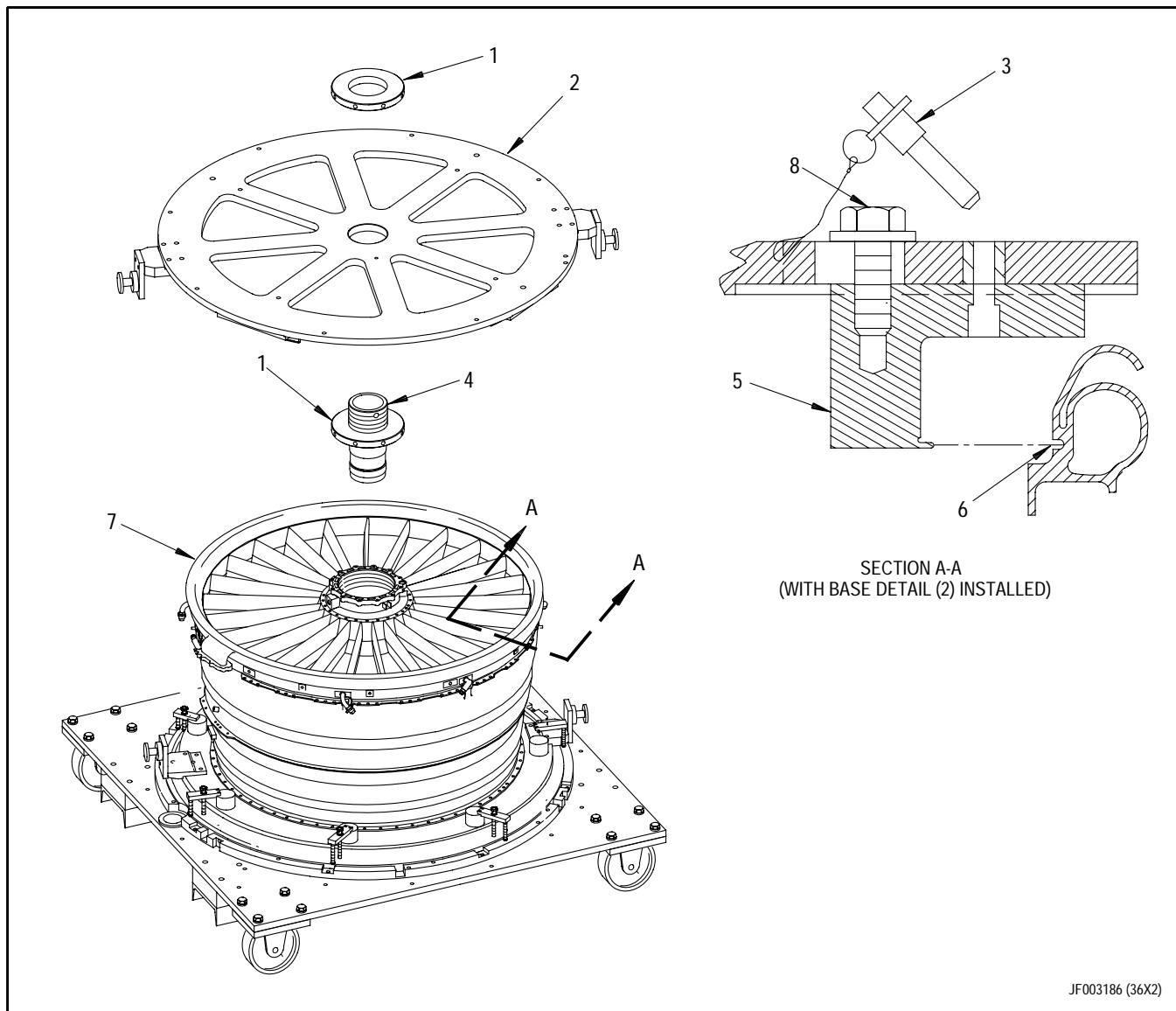


Figure 7. Rotating Inlet/Fan Module to Front End Up Position (Sheet 2 of 3)



1. Nut Detail
2. Base Detail
3. Ball Lock Pin
4. Shaft Detail
5. Slide Jaw Detail
6. Slot
7. Fan Inlet Case
8. Bolt

Figure 1. Rotating Inlet/Fan Module to Front End Up Position (Sheet 3 of 3)

WORK PACKAGE**TECHNICAL PROCEDURES****INLET/FAN MODULE
(FRONT SECTION) -****DISMANTLING****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 24

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	27	6C	24	13	1
2	15	6D Added	23	14	6
3	24	7 - 8	27	15	4
4	16	9 - 10	24	16	6
5	18	11	17	17	15
6 - 6A	24	12	18	18 - 20	20
6B Blank Added	13				

REFERENCE MATERIAL REQUIRED

Title	Number
Inlet/Fan Module - - - - -	T.O.2J-F100-53-6
External Parts, Inlet/Fan Module; Blades, Compressor	
Rotor, Third Stage - Removal - - - - -	WP 011 00
Case Assembly, Fan Inlet - Disassembly - - - - -	WP 021 00
Wrench, Hydraulic, PWA 50308 - - - - -	T.O. 32B14-5-2-1

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

T.O. No.	Date	Level	Title (ECP No.)
T.O. 2J-F100229-546	30 Sep 95	O/I,D	Modification of Retainer Ball Lock Pin Handle PWA 57614, F100-PW-229 Engine, F-15/F-16 Aircraft (ECP 93QC038)

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Dye, layout	Micro-Supreme (Purple) Mi Chrome & Chem Co.
Marker, Marks-A-Lot	Carter's Ink Co.
Oil, lubricating	MIL-L-7808

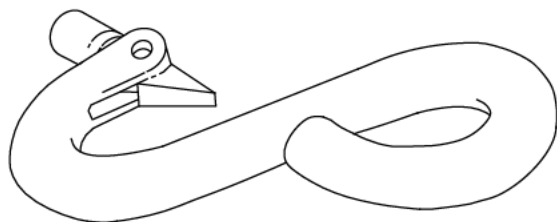
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

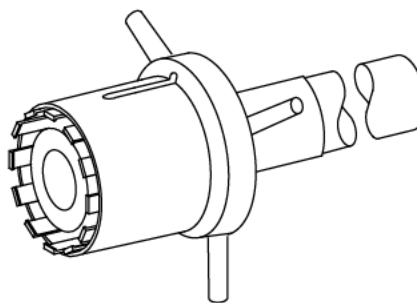
Paragraph	Function - Tool Nomenclature	Tool Number
2	NO. 1 BEARING AND NO. 1 BEARING SEAL SEAT - REMOVAL	
	ADAPTER SET, HYDRAULIC WRENCH TO WRENCH - - - - -	PWA 57806
		OR
	ADAPTER SET, HYDRAULIC WRENCH TO WRENCH - - - - -	PWA 57649
	ADAPTER, TORQUE, REMOVE AND INSTALL, VARIOUS NUTS -	PWA 57906
		OR
	ADAPTER SET, REMOVE/INSTALL VARIOUS RETAINING NUTS -	PWA 57807
		OR
	ADAPTER SET, REMOVE/INSTALL VARIOUS RETAINING NUTS -	PWA 57650
	WRENCH, HYDRAULIC - - - - -	PWA 50308
	ADAPTER, NO. 1 BEARING AND SEAL PLATE PULLER - - - - -	PWA 57408
	PULLER, NO. 1 BRG INNER RACE AND SLINGER	
	(HYDRAULIC) - - - - -	PWA 56595
		OR
	PULLER, NO. 1 BEARING AND SEAL PLATE - - - - -	PWA 22726
	PUMP, HYDRAULIC HAND - - - - -	PWA 55380
	RETAINER, NO. 1 BEARING INNER RACE ROLLERS - - - - -	PWA 51791
	PULLER, NO. 1 BEARING OUTER RACE - - - - -	PWA 57545
3	FAN INLET CASE ASSEMBLY - REMOVAL	
	RETAINER, INLET/FAN MODULE, HANDLING, FRONT - - - - -	PWA 57803
	RETAINER-INLET, FAN MODULE HANDLING, FRONT - - - - -	PWA 57614
	SLING, HANDLING - - - - -	PWA 56336
	HOOK, SAFETY - - - - -	PWA 2388
	ADAPTER, LIFT AND TRUNNION (TWO REQUIRED) - - - - -	PWA 26147
	PULLER, FAN INLET CASE - - - - -	PWA 57853

ILLUSTRATED SUPPORT EQUIPMENT



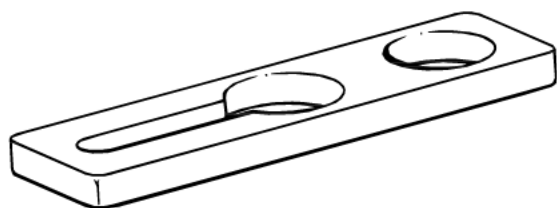
PWA 2388 -C

Figure T1. PWA 2388 HOOK



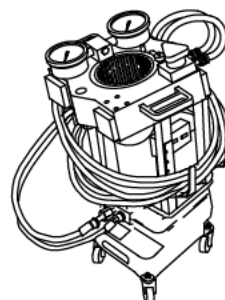
PWA 22726 -C

Figure T2. PWA 22726 PULLER



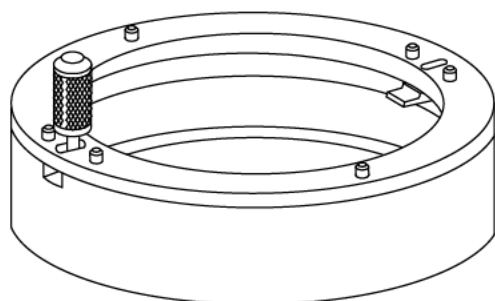
PWA 26147 -C

Figure T3. PWA 26147 ADAPTER



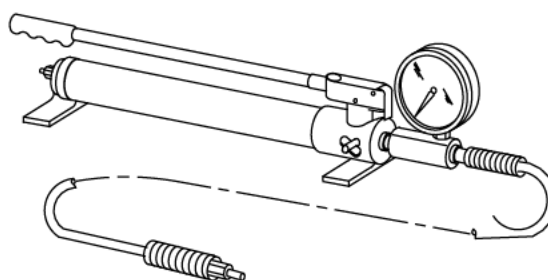
PWA 50308 -C

Figure T4. PWA 50308 WRENCH



PWA 51791 -C

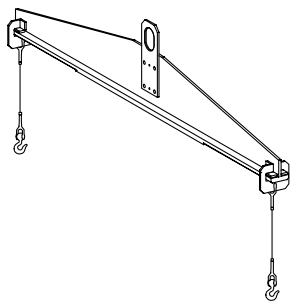
Figure T5. PWA 51791 RETAINER



PWA 55380 -C

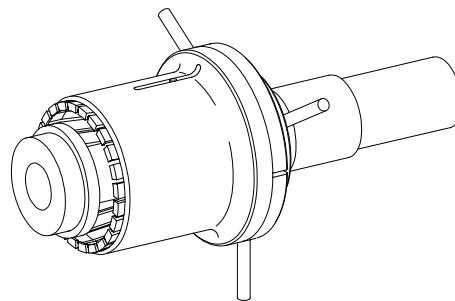
Figure T6. PWA 55380 PUMP

ILLUSTRATED SUPPORT EQUIPMENT (continued)



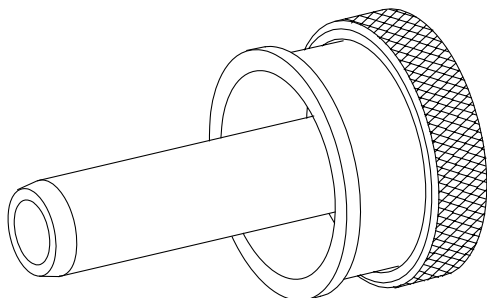
PWA 56336 -C

Figure T7. PWA 56336 SLING



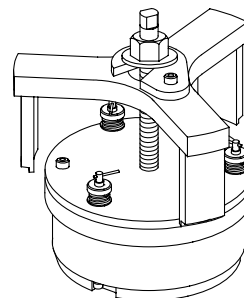
PWA 56595 -C

Figure T8. PWA 56595 PULLER



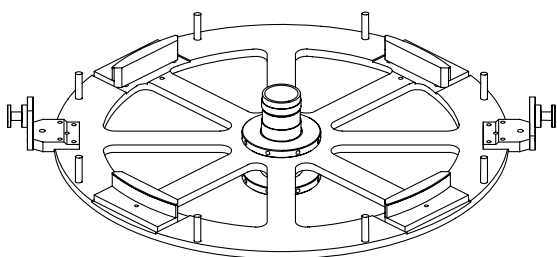
PWA 57408 -C

Figure T9. PWA 57408 ADAPTER



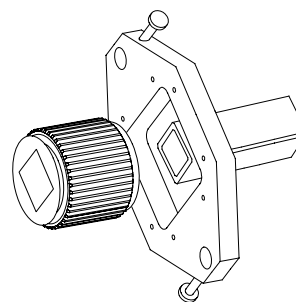
PWA 57545 -C

Figure T10. PWA 57545 PULLER



PWA 57614 -C

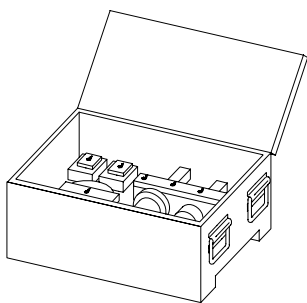
Figure T11. PWA 57614 RETAINER-INLET



PWA 57649 -C

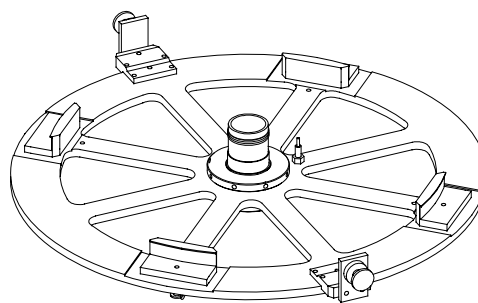
Figure T12. PWA 57649 ADAPTER-SET

ILLUSTRATED SUPPORT EQUIPMENT (continued)



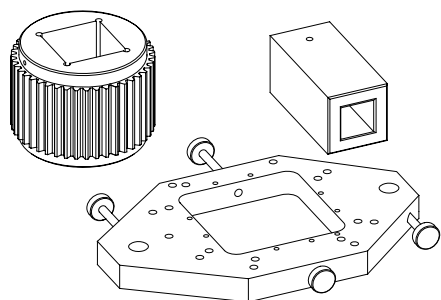
PWA 57650 -C

Figure T13. PWA 57650 ADAPTER SET



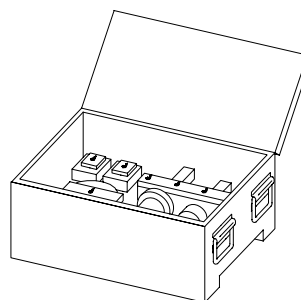
PWA 57803 -C

Figure T14. PWA 57803 RETAINER



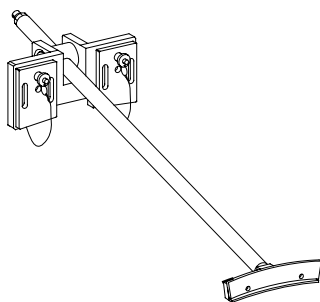
PWA 57806 -C

Figure T15. PWA 57806 ADAPTER SET



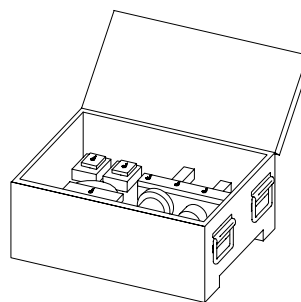
PWA 57807 -C

Figure T16. PWA 57807 ADAPTER SET



PWA 57853 -C

Figure T17. PWA 57853 PULLER



PWA 57906 -C

Figure T18. PWA 57906 ADAPTER

1. INTRODUCTION.

- a. This work package contains instructions for removal of No. 1 bearing and seal seat and removal of fan inlet case from fan case.

1A. PRELIMINARY INSTRUCTIONS.

- a. Remove front compressor inlet synchronizing ring and compressor inlet variable vane linkage system per WP 011 00.

2. NO. 1 BEARING AND NO. 1 BEARING SEAL SEAT - REMOVAL.

(See Figures 1, 1A, 1B, and 2.)

- a. Remove No. 1 bearing inner race retaining nut as follows:

- (1) Install protective cover over inlet area.
- (2) Secure quad N1 sensing electrical cable and Ps2 heater cable to protective cover on fan inlet.
- (3) Place PWA 57806 assembly M base assembly on bench with flat surface side down. (See figures 1 and 1A for adapter set assembly identification.) Secure PWA 57906 assembly F sub base with side marked THIS SIDE OUT 229 ENGINE facing technician to base assembly with PWA 57906 assembly H cap screws per figure 1B, Sheet 1.

- (4) Install base assembly and sub base as an assembly onto No. 1 bearing housing with side marked THIS SIDE OUT 229 ENGINE facing engine. Secure with PWA 57906 assembly H cap screws.

- (5) Insert PWA 57906 assembly D adapter through square cut out in base assembly and engage drum rotor assembly inner diameter wrenching slots.



Failure to unlock rear retainer locking legs before rotating drum rotor will result in damage to drum rotor assembly.

- (6) Unlock rear retainer locking legs from drum rotor.
- (7) Install PWA 57906 assembly A retainer through square cut out in base assembly. Engage slots in inner race retaining nut by rotating drum rotor assembly as necessary.
- (8) Install PWA 57806 assembly L adapter assembly into PWA 57806 assembly K adapter assembly and secure with set screw.
- (9) Install assembled adapters onto PWA 57906 assembly D adapter. Engage and tighten PWA 57806 base assembly retaining screws fingertight.

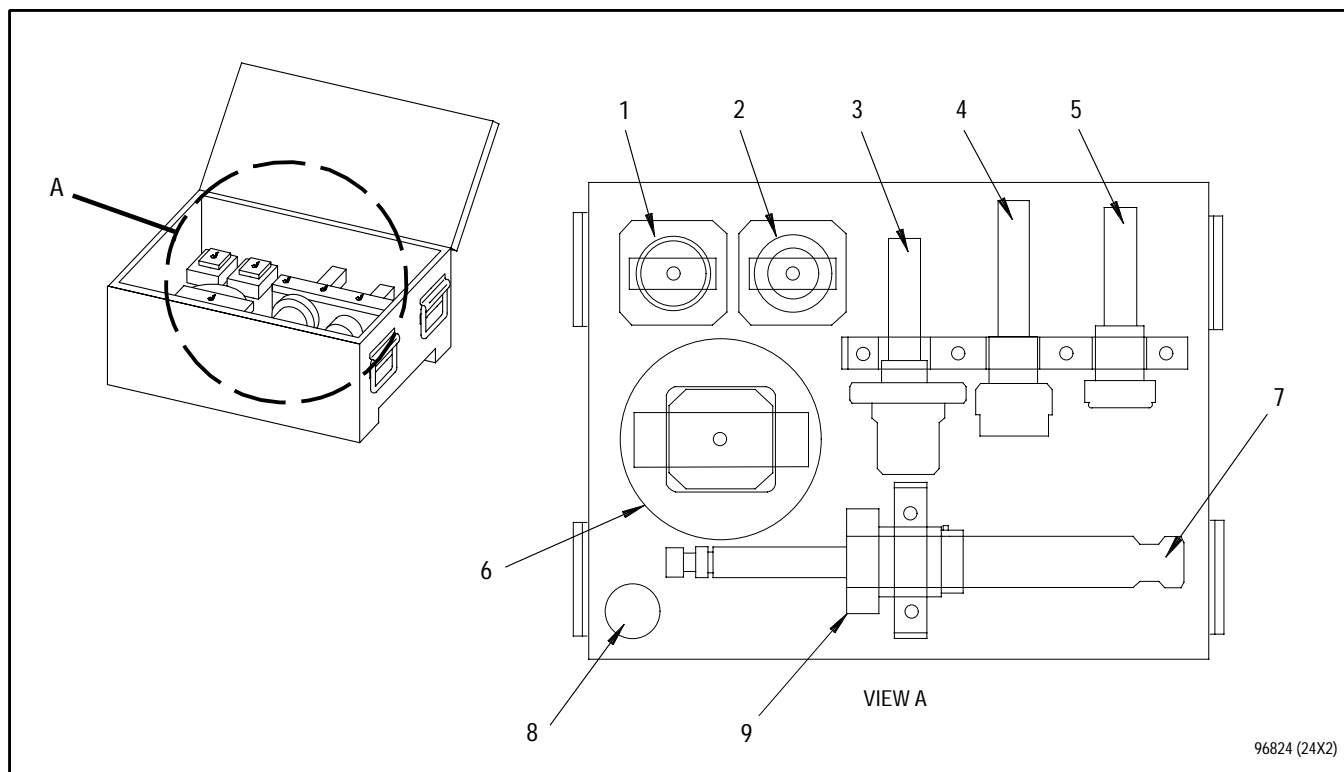


Figure 1. PWA 57906 Adapter, PWA 57807, or PWA 57650 Adapter Set

Legend for figure 1

- | | | |
|----|---------------------------------------------------|------------|
| 1. | Retainer - No. 1 inner race retaining nut | Assembly A |
| 2. | Retainer Assembly | Assembly B |
| 3. | Adapter Assembly - No. 1 outer race retaining nut | Assembly C |
| 4. | Adapter Assembly - No. 1 inner race retaining nut | Assembly D |
| 5. | Adapter Assembly - compressor disk and hub | Assembly E |
| 6. | Sub Base | Assembly F |
| 7. | Adapter Assembly - turbine shaft nut | Assembly G |
| 8. | Cap Screws | Assembly H |
| 9. | Retainer - turbine shaft nut | Assembly I |

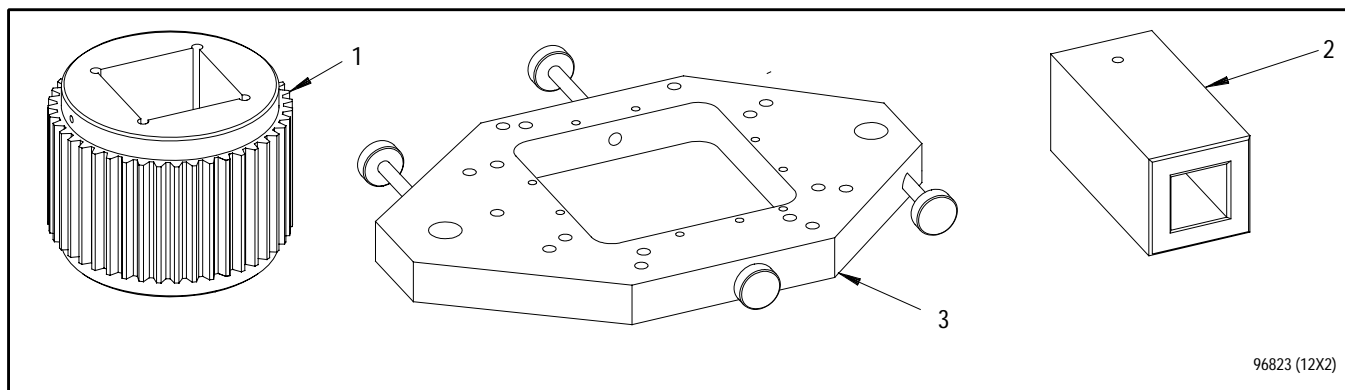


Figure 1A. PWA 57806 or PWA 57649 Adapter Set

Legend for figure 1A

- | | | |
|----|-------------------------|------------|
| 1. | Adapter Assembly | Assembly K |
| 2. | Wrench Adapter Assembly | Assembly L |
| 3. | Base Assembly | Assembly M |

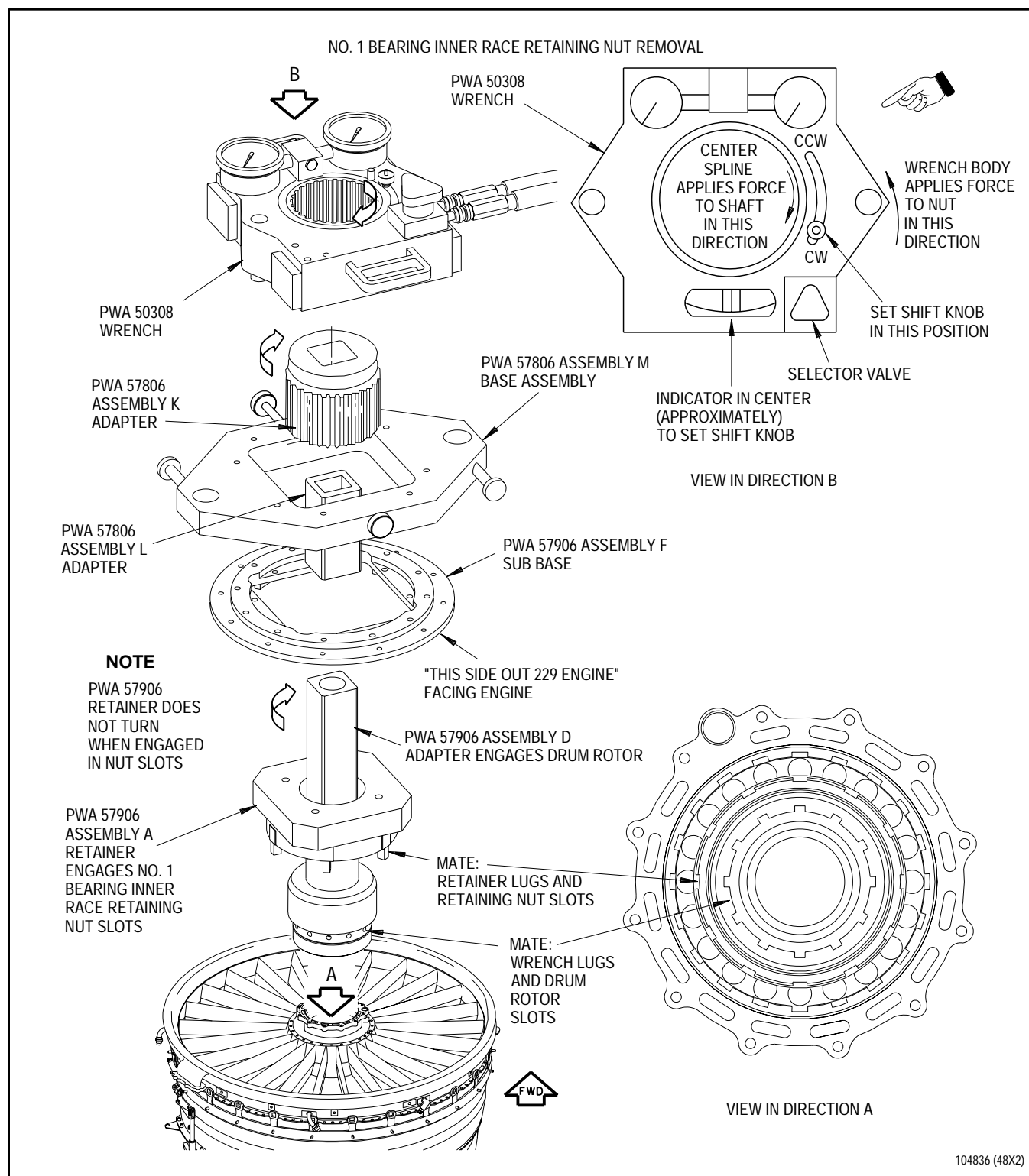


Figure 1B. No. 1 Bearing Inner And Outer Race Retaining Nuts - Removal (Sheet 1 of 2)

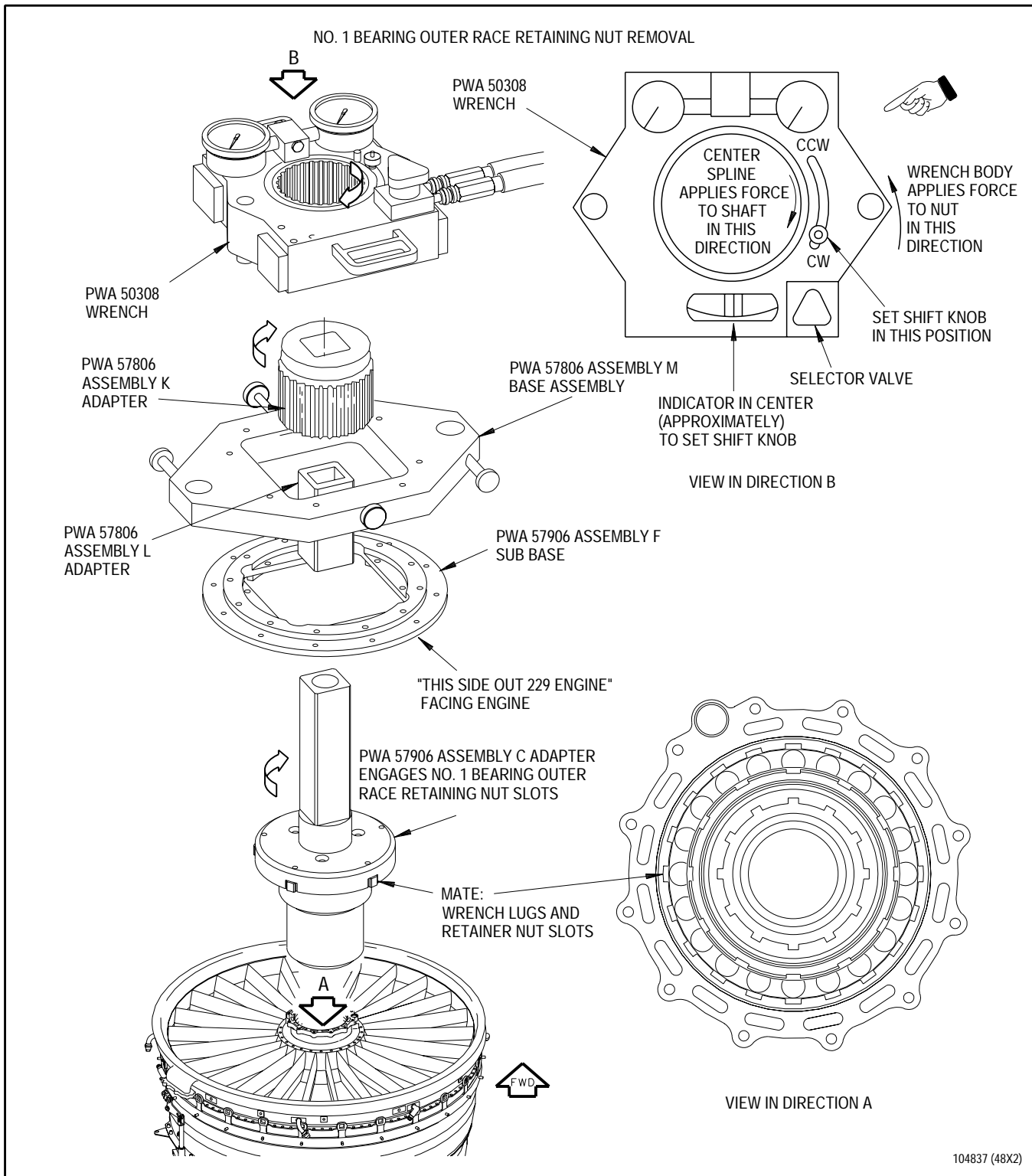


Figure 1B. No. 1 Bearing Inner And Outer Race Retaining Nuts - Removal (Sheet 2 of 2)

- (10) Using hoist and suitable nylon strap, install PWA 50308 hydraulic wrench onto PWA 57806 assembly K adapter so that drive pins of wrench engage holes in base assembly detail. Secure with thumbscrews.
- (11) Ensure quad N1 sensor cable and Ps2 heater cable are secured to protective cover on inlet area and do not interfere with rotor rotation during removal of inner race retaining nut.



Failure to ensure proper rotational direction of hydraulic wrench before use may result in overtorque on retaining nut causing damage to engine components.

NOTE

- Operating instructions for PWA 50308 wrench are found in T.O. 32B14-5-2-1.
 - Clockwise direction is determined by viewing module from front of engine.
- (12) Shift selector knob for clockwise spline rotation per figure 1B, sheet 1. Actuate wrench to break torque on retaining nut. PWA 57906 assembly D adapter will turn clockwise.
 - (13) Remove tooling and inner race retaining nut.

- b. Remove No. 1 bearing outer race retaining nut as follows:
 - (1) Install PWA 57906 assembly C adapter into engine and engage wrenching slots of No. 1 bearing outer race retaining nut per figure 1B, Sheet 2.
 - (2) If necessary place PWA 57806 assembly M base assembly on bench with flat surface side down. Secure PWA 57906 assembly F sub base with side marked THIS SIDE OUT 229 ENGINE facing technician to base assembly using PWA 57906 assembly H cap screws.
 - (3) Install base assembly and sub base as an assembly onto No. 1 bearing housing with side marked THIS SIDE OUT 229 ENGINE facing engine. Secure with PWA 57906 assembly H cap screws.
 - (4) If required, install PWA 57806 assembly L adapter assembly into PWA 57806 assembly K adapter assembly and secure with set screw.
 - (5) Install assembled adapters onto PWA 57906 assembly C adapter. Engage and tighten PWA 57806 assembly M base assembly retaining screws fingertight.
 - (6) Using hoist and suitable nylon strap, install PWA 50308 hydraulic wrench onto PWA 57806 assembly M base assembly so that drive pins of wrench assembly engage holes in base assembly. Secure with thumbscrews.



Failure to ensure proper rotational direction of hydraulic wrench before use may result in overtorque on retaining nut causing damage to engine components.

NOTE

- Operating instructions for PWA 50308 wrench are found in T.O. 32B14-5-2-1.
- Clockwise direction is determined by viewing module from front of engine.
- Nut has left hand threads.
 - (7) Shift selector knob for clockwise spline rotation per figure 1, sheet 2. Actuate wrench to break torque on retaining nut left hand thread. PWA 57906 assembly C adapter will turn clockwise.

(8) Remove tooling and outer race retaining nut.

c. Remove No. 1 bearing inner race/rollers(1, figure 2) as follows:

(1) Remove protective cover from PWA 57408 adapter and thread adapter into ID of front hub(4). Loosen adapter quarter turn.

(2) Install PWA 56595 puller as follows:

(a) Locate pilot detail of puller in ID of adapter.

(b) Position collet (fingers) of puller in puller groove of bearing inner race.

(c) Turn handles of locking nut clockwise until collet (fingers) are secure in puller groove of bearing inner race(1).

- (3) Attach PWA 55380 hydraulic pump to puller.

NOTE

If for any reason outer race is to be removed from inner race and rollers, use PWA 51791 retainer in place of outer race to prevent rollers from leaving cage.

NOTE

No. 1 bearing outer race may remain attached to inner race and rollers as they are removed.

- (4) Rotate drum rotor and actuate pump to remove No. 1 bearing inner race/rollers from module. Puller shall not be left in free state. One person shall hold puller centered while another applies hydraulic pressure to avoid damage to No. 1 bearing. Provide container to keep bearing details together. Remove tooling.
- d. Remove seal seat(3,figure 2) as follows:
- (1) Remove seal seat(3) using same adapter, puller, and hydraulic pump as used to remove No. 1 bearing inner race/rollers. Refer to step c.
 - (2) Remove puller and hydraulic pump.
- (3) Remove adapter and screw protective cover over adapter threads.
- e. Remove No. 1 bearing outer race(2) as follows:
- (1) Install PWA 57545 puller detail-15 puller guide into outer race(2) and engage clamp legs to rear face of outer race using knurled knobs.
 - (2) Install detail-3 base assembly over stud and secure with swing washer and nut.
 - (3) Tighten nut and remove outer race.
 - (4) Assemble inner race/roller and outer race, ensuring puller groove of inner race and pins of outer race face upward.
 - (5) Preserve No. 1 bearing assembly with MIL-L-7808 engine oil and place in protective container.
- f. Install suitable protector over No. 1 bearing area of fan inlet case to protect exposed carbon face seal.

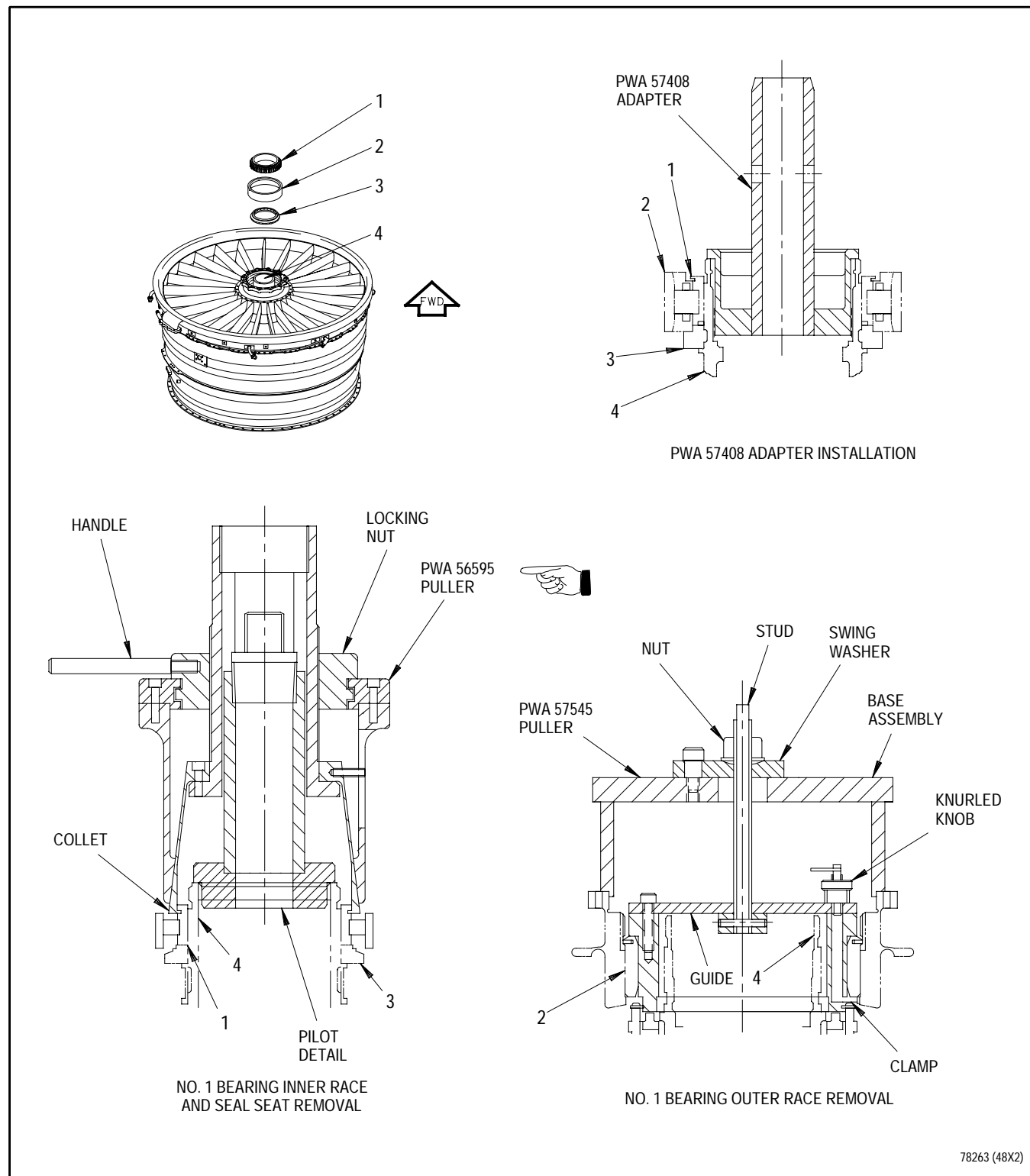


Figure 2. No. 1 Bearing and No. 1 Bearing Seal Seat - Removal

Legend for figure 2

1. No. 1 bearing inner race/rollers
2. No. 1 bearing outer race
3. Seal seat
4. Front hub

3. FAN INLET CASE ASSEMBLY - REMOVAL.

(See Figures 3 and 4.)

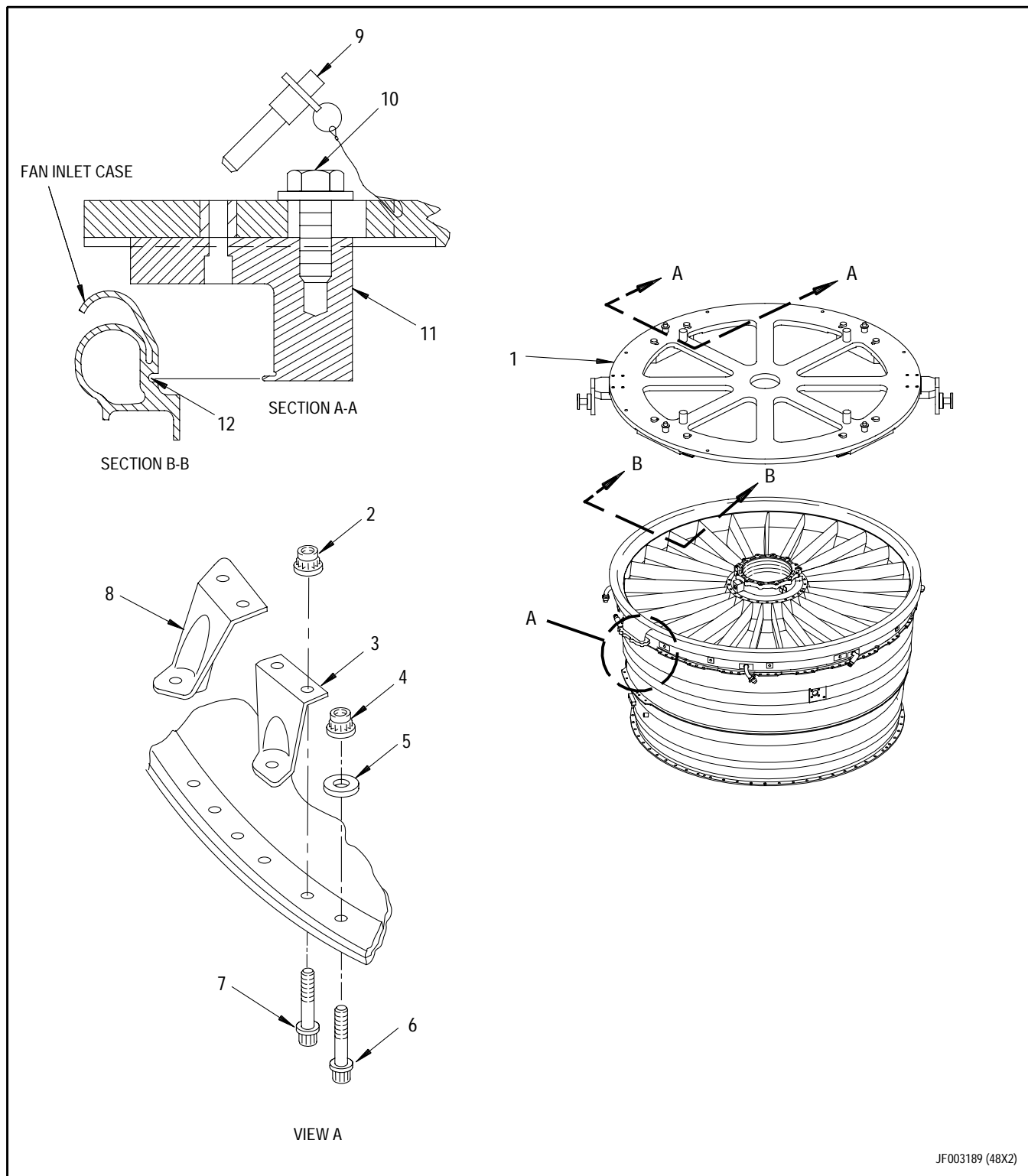
NOTE

Protector over No. 1 bearing area of fan inlet case shall remain installed to protect carbon seal face.

- a. Mark location of EDU front brackets(3 and 8) to facilitate installation.
- b. Remove brackets(3 and 8) by removing bolts(7), and nuts(2).
- c. Remove nuts(4), spacers(5), and bolts(6) securing fan inlet case to Flange B.

Legend for figure 3

1. Base detail
2. Nut
3. EDU front bracket
4. Nut
5. Spacer
6. Bolt
7. Bolt
8. EDU front bracket
9. Ball lock pin
10. Bolt
11. Slide jaw detail
12. Slot
13. Pressure tube
14. Scavange tube
15. Ps2 tube
16. No. 1 bearing housing
17. Bolt
18. Case ID flange

**Figure 3. Fan Inlet Case - Removal (Sheet 1 of 2)**

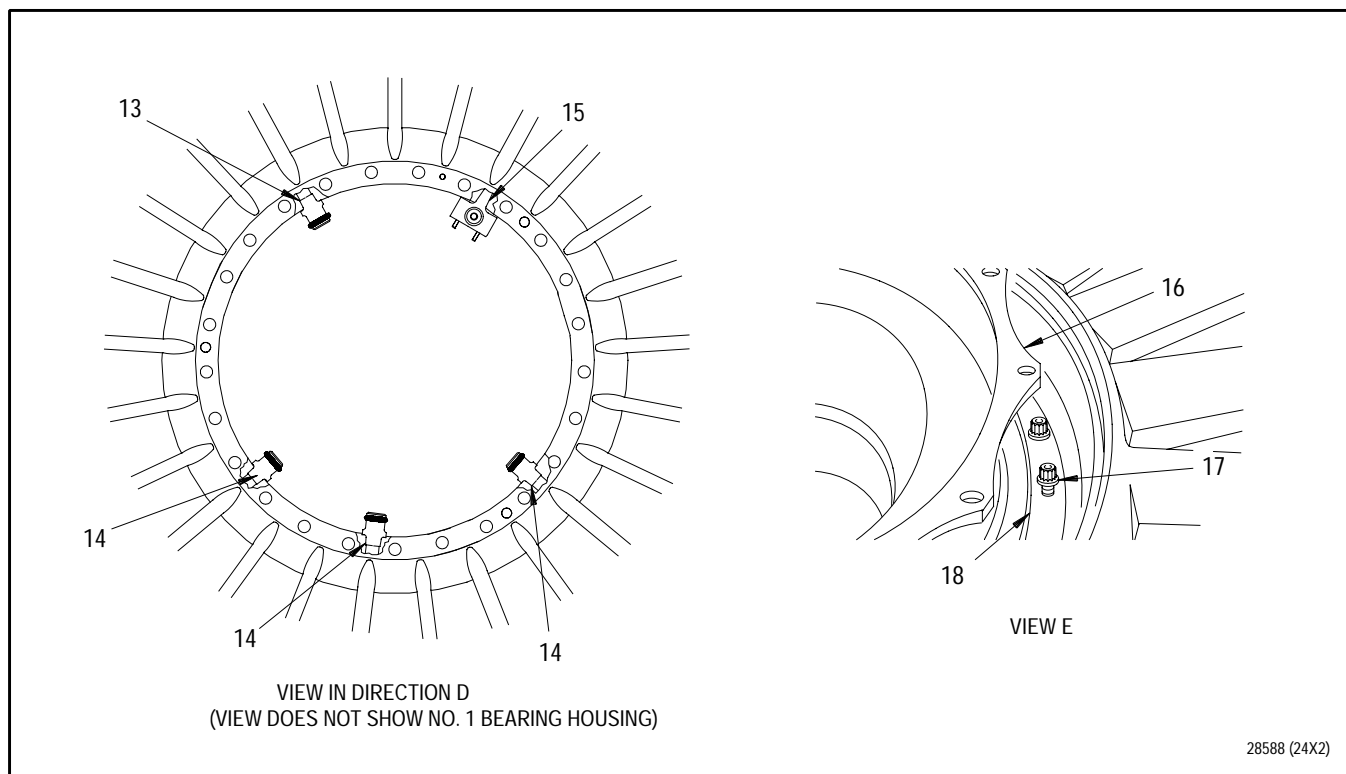


Figure 3. Fan Inlet Case - Removal (Sheet 2 of 2)



For engines not incorporating lockwire on No. 1 bearing housing bolt heads, do not loosen No. 1 bearing housing support bolts until after inlet case is removed from engine. Engine damage due to lockwire fragments may result if No. 1 bearing housing support bolts with lockwired shanks are removed prior to removal of lockwire on threaded (shank) end of bolts.

NOTE

- No. 1 bearing, No. 1 bearing seal seat, and No. 1 bearing housing shall not be removed unless maintenance to be done requires it.
 - For engines not incorporating lockwire on No. 1 bearing housing bolt heads, case shall be removed with No. 1 bearing housing installed on case. Proceed to step e.
 - For engines incorporating lockwire on No. 1 bearing housing bolt heads, case may be removed without removing No. 1 bearing housing from fan module.
- d. For engines incorporating lockwire on No. 1 bearing

housing bolt heads, proceed as follows: (See figure 3, Sheet 2.)



Pressure, scavenge and Ps2 tubes do not come out of fan inlet case, and shall not be rotated to prevent damage.

- (1) Pull pressure(13), scavenge(14) and Ps2(15) tubes outward away from housing(16) until they stop. Ensure tube ID ends clear housing(16). Secure temporarily.
- (2) Remove lockwire from heads of bolts(17).
- (3) Remove all but one bolt(17).
- (4) Loosen remaining bolt, leaving enough thread engagement to ensure that housing will be held after breaking snap diameter.
- (5) Break snap diameter using three PN ST2016-16 (or equivalent) jackscrews. Remove jackscrews.

NOTE

PWA 57803 retainer contains PWA 57614 details.

- e. Attach PWA 57803 front retainer as follows:

NOTE

Shaft and nut details of PWA 57803 front retainer shall not be used in fan inlet case removal procedure.

- (1) Loosen detail-20 bolts(10) and position PWA 57614 retainer detail-5 slide jaws(11) are inward to prevent interference with fan inlet case.
- (2) Using overhead hoist, PWA 56336 sling, PWA 2388 hook, and PWA 26147 adapters, lower base detail-1(1). Align guide pin with locator hole on fan inlet case inner flange.
- (3) Move detail-5 slide jaw(11) outward until they engage slot(12) in fan inlet case. Secure using ball lock pin(9). Tighten detail-20 bolts(10).



Use of force to remove inlet case could damage case or PWA 57803 front retainer.

NOTE

Inlet case has two configurations, one with DC 3120 RTV rubber in fairing pocket and one without. Cases with rubber do not separate easily.

- f. Remove inlet case using PWA 57853 puller as follows:
(See figure 4.)
- (1) Remove four legs of PWA 57853 tool from storage container and remove two ball lock pins from each leg.

- (2) Select four locations, as equally spaced as hardware, brackets and tubing will allow, around fan case OD. Each leg, when installed, must straddle synchronizing ring mount hole boss at top and align perpendicular to rear flange of fan case without interference with other hardware.
- (3) Install one leg by placing bracket with two plates held rearward into machined groove adjacent to synchronizing ring attachment boss of inlet case. Make sure pins of bracket engage two of inlet/fan case attachment holes in rear flange of inlet case.
- (4) While holding pins in flange holes, slide two plates forward and install ball lock pins to hold them in place.
- (5) Install spacer into forward side of rear flange of fan case, engaging two dowel pins of spacer into rear flange attachment holes of fan case.
- (6) Rotate main shaft of tool to raise or lower foot while engaging lip of foot behind spacer.
- (7) Repeat steps 1 through 6 for installation of other three legs.
- (8) Use a 3/8 inch square drive to rotate (clockwise) four leg main shafts in equal increments to lift and remove inlet case from fan case. Do not rotate shaft in more than 1/4 turn increments to begin separation of cases.

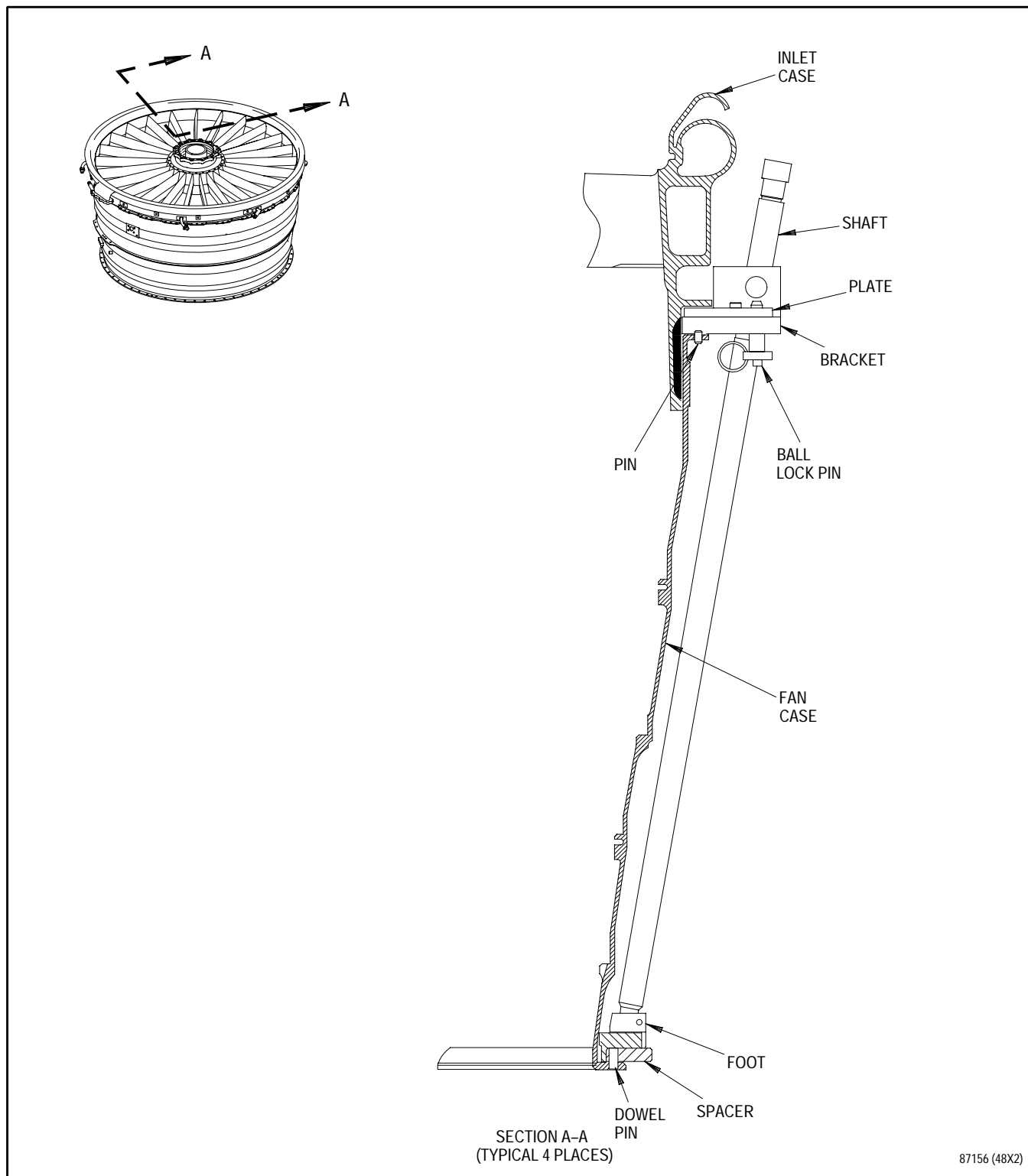


Figure 4. Fan Inlet Case - Removal

- (9) Remove tooling by disengaging each foot from behind spacer and by removing ball lock pins holding plates in place. Remove spacers and return all four legs with ball lock pins installed to storage container.
- g. Ensure quad N1 sensor cable and Ps2 heater cable are properly secured and free from 1st stage blades.
- h. Remove fan inlet case and position front end up on wooden supports large enough to prevent damage to variable vanes and inlet shroud.
- i. Further disassembly of fan inlet case, if required, is accomplished per WP 021 00.
- j. If no further maintenance is necessary, store fan inlet case in container or parts rack.
- k. Using overhead hoist and PWA 56336 sling remove PWA 57803 front retainer. Remove tooling. Maintain tension on sling while slide jaw details-5 are disengaged.

WORK PACKAGE**TECHNICAL PROCEDURES****BLADES, COMPRESSOR ROTOR,
FIRST AND SECOND STAGES -
REMOVAL****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 28

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	23	8	23	12B Blank Added	8
4	8	8A	9	13	23
4A	23	8B Blank Added	8	14 - 17	0
4B Blank Added	15	9 - 11	23	18	17
5	0	12	8	19 - 21	0
6	23	12A	23	22 Blank	0
7	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Inlet/Fan Module - - - - -	T.O. 2J-F100-53-6
Marking, Service Cycle - - - - -	WP 015 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

T.O. No.	Date	Level	Title (ECP No.)
T.O. 2J-F100229-546	30 Sep 95	O/I	Modification of Retainer Ball Lock Pin Handle PWA 57614, F100-PW-229 Engine, F-15/F-16 Aircraft (ECP 93QC038)
T.O. 2J-F100229(I)-515	15 Oct 96	O/I	Retrofit of PN 4081566 First Stage Fan Shroud Featuring a Tighter Fit, F100-PW-229 Engine, F15/F-16 Aircraft (ECP 93QA034)

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

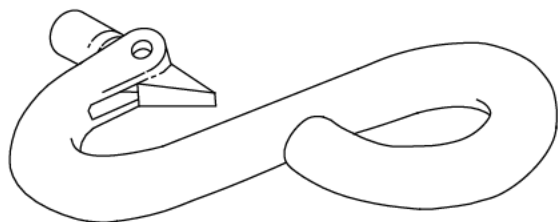
APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2	FRONT COMPRESSOR INLET AIR SEAL AND FIRST STAGE COMPRESSOR ROTOR BLADES - REMOVAL	
	FIXTURE, HOLDING, 1ST STAGE FAN BLADE - - - - -	PWA 71457
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57907
		OR
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57801
		AND
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57637
3	FIRST STAGE FAN AIR SEAL AND FIRST STAGE COMPRESSOR STATOR ASSEMBLY - REMOVAL	
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57907
		OR
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57801
		AND
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57637

APPLICABLE SUPPORT EQUIPMENT (continued)

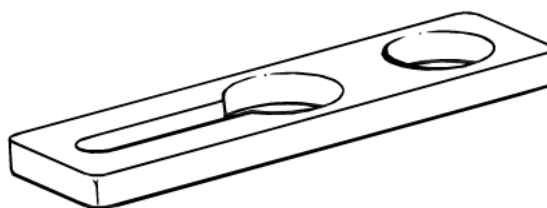
Paragraph	Function - Tool Nomenclature	Tool Number
4	SECOND STAGE COMPRESSOR ROTOR BLADES - REMOVAL	
	PULLER, SET - - - - -	PWA 57637
	FIXTURE, HOLDING, 2ND STAGE FAN BLADE - - - - -	PWA 71458
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57907
		OR
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57637
5	SECOND STAGE FAN AIR SEAL AND SECOND STAGE COMPRESSOR STATOR ASSEMBLY - REMOVAL	
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57907
		OR
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57637
6	FIRST AND SECOND STAGE COMPRESSOR AIR SEALS - REMOVAL	
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57907
		OR
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57637
7	FRONT COMPRESSOR DRUM ROTOR - REMOVAL	
	RETAINER, INLET/FAN MODULE, FRONT HANDLING - - - - -	PWA 57803
		OR
	RETAINER, INLET, FAN MODULE HANDLING, FRONT - - - - -	PWA 57614
	ADAPTER, LIFT AND TRUNNION (TWO REQUIRED) - - - - -	PWA 26147
	SLING, HANDLING - - - - -	PWA 56336
	HOOK, SAFETY (TWO REQUIRED) - - - - -	PWA 2388
8	FAN CASE AND THIRD STAGE FAN AIR SEAL - REMOVAL	
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57907
		OR
	PULLER SET, FAN MODULE AIR SEALS, INNER AND OUTER	PWA 57637

ILLUSTRATED SUPPORT EQUIPMENT



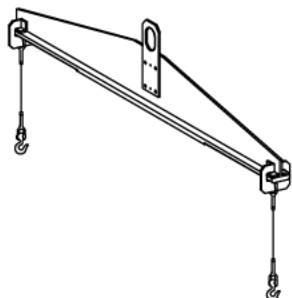
PWA 2388 -C

Figure T1. PWA 2388 Hook



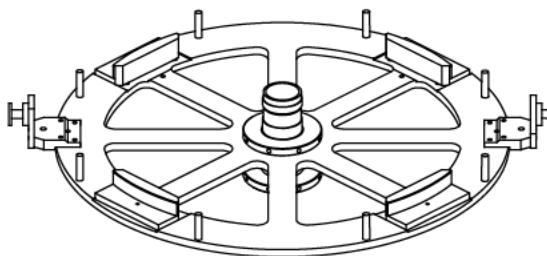
PWA 26147 -C

Figure T2. PWA 26147 Adapter



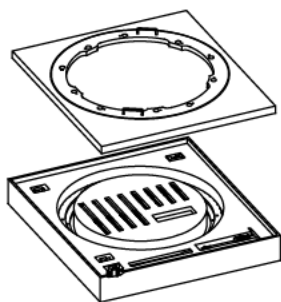
PWA 56336 -C

Figure T3. PWA 56336 Sling



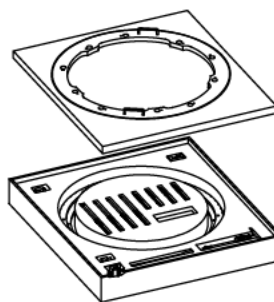
PWA 57614 -C

Figure T4. PWA 57614 Retainer



PWA 57637 -C

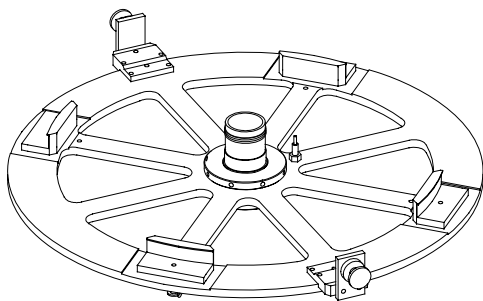
Figure T5. PWA 57637 Puller



PWA 57801 -C

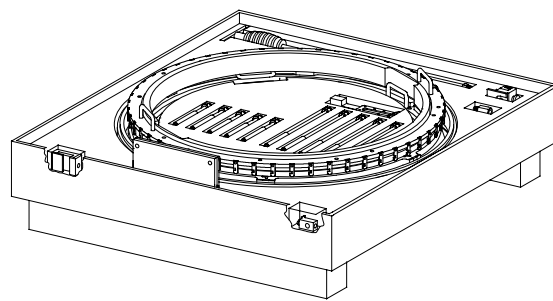
Figure T6. PWA 57801 Puller

ILLUSTRATED SUPPORT EQUIPMENT (continued)



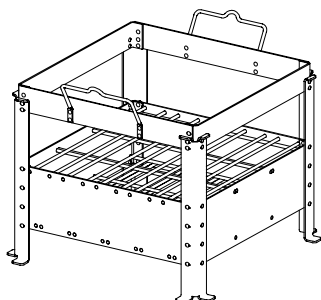
PWA 57803 -C

Figure T7. PWA 57803 RETAINER



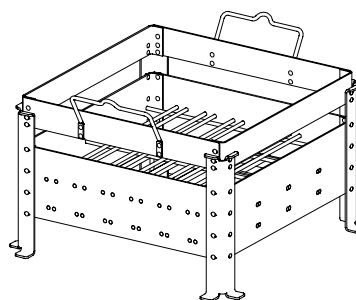
PWA 57907 -C

Figure T8. PWA 57907 PULLER SET



PWA 71457 -C

Figure T9. PWA 71457 FIXTURE



PWA 71458 -C

Figure T10. PWA 71458 FIXTURE

1. INTRODUCTION.

- a. This work package contains instructions for removal of 1st and 2nd stage compressor rotor blades. Disassembly is done with module vertical and in a rear down position. Third stage compressor rotor blades were removed in WP 011 00.

2. FRONT COMPRESSOR INLET AIR SEAL AND FIRST STAGE COMPRESSOR ROTOR BLADES - REMOVAL.

(See Figures 1 and 1A.)

- a. Remove rivet pins(2) and rivet pin collars(1) securing air seal(3) to drum(5) by holding rivet pins with standard hexagon wrench and unscrewing collars with box wrench. Discard rivet pins and collars.
- b. Install PWA 57637 detail-2 puller on air seal(3) and secure puller using hand knob. Slide tool to various positions around air seal(3) while using knocker to gradually remove air seal. Remove tool.
- c. Install protective covering on air seal.



Failure to remove blades carefully, according to the following procedures, can result in nonrepairable blade damage.

NOTE

Due to mid-span shroud of blades, any one blade cannot be removed from drum rotor without removing all blades of assembly.

- d. Carefully remove blades(4) in a clockwise direction, progressively moving blades out of drum rotor a little at a time until all blades can be manually removed. Place blades into PWA 71457 fixture, blade root up. If necessary, PWA 57907 or PWA 57637 puller set may be used to remove blades, as follows:

- (1) Assemble PWA 57637 details-4, -5, and PWA 57907 detail-26 or PWA 57637 detail-19 or-24.(See figure 1A.)
 - (2) Insert puller fork over blade airfoil with tangs toward inside diameter of hub.
 - (3) Slide tool inboard until tangs are located under blade root platform.(See figure 1A.)
 - (4) Use upward stroke of detail-5 puller hammer to loosen blade.
- e. Mark total low cycle fatigue cycles on all removed blades per T.O. 2J-F100-53-6, WP 015 00.
 - f. Remove all counterweights (7, figure 1) from disk by machining flare of retaining rivet(6). Drift out rivet.

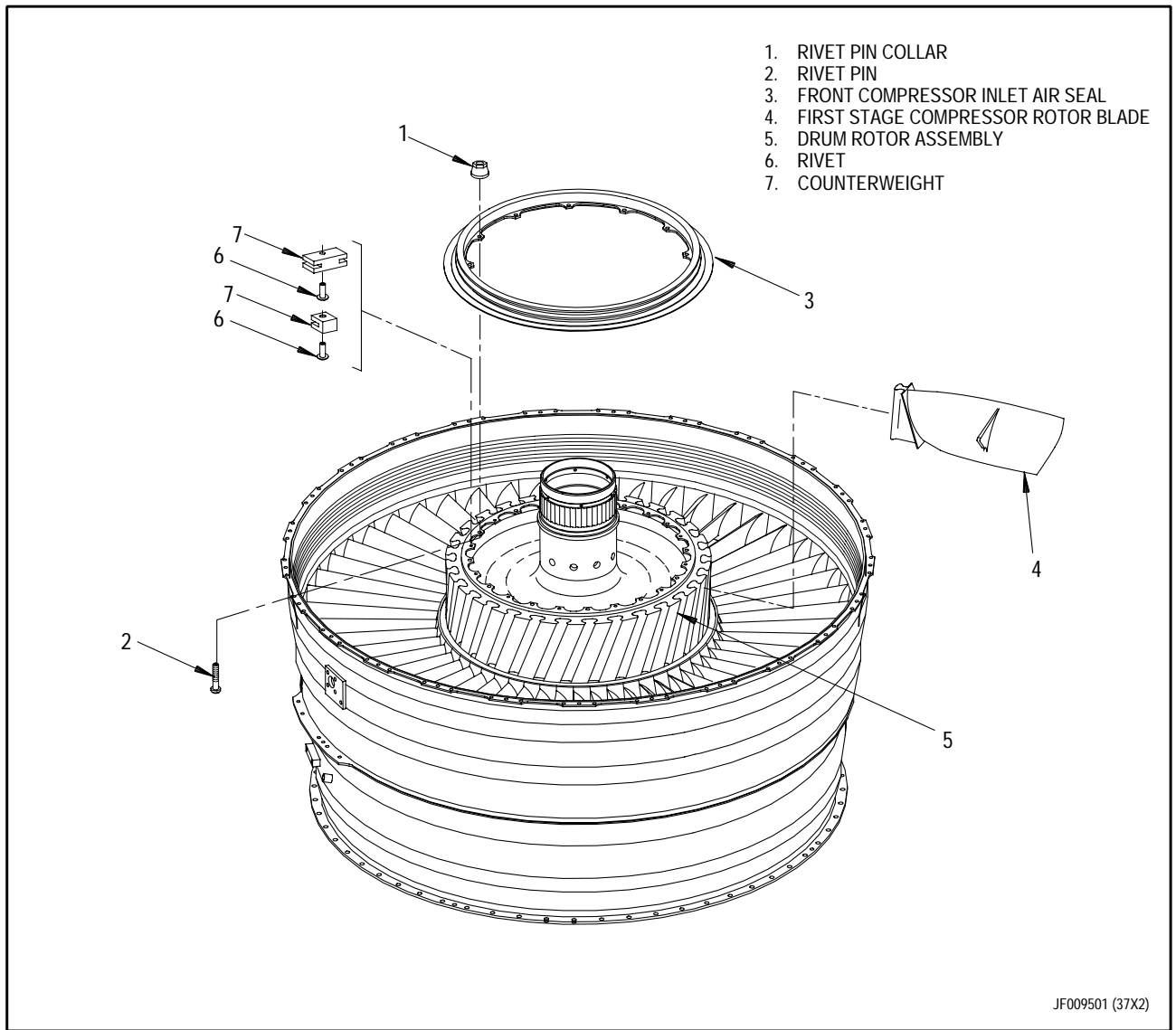


Figure 1. Front Compressor Inlet Air Seal and First Stage Compressor Rotor Blades - Removal

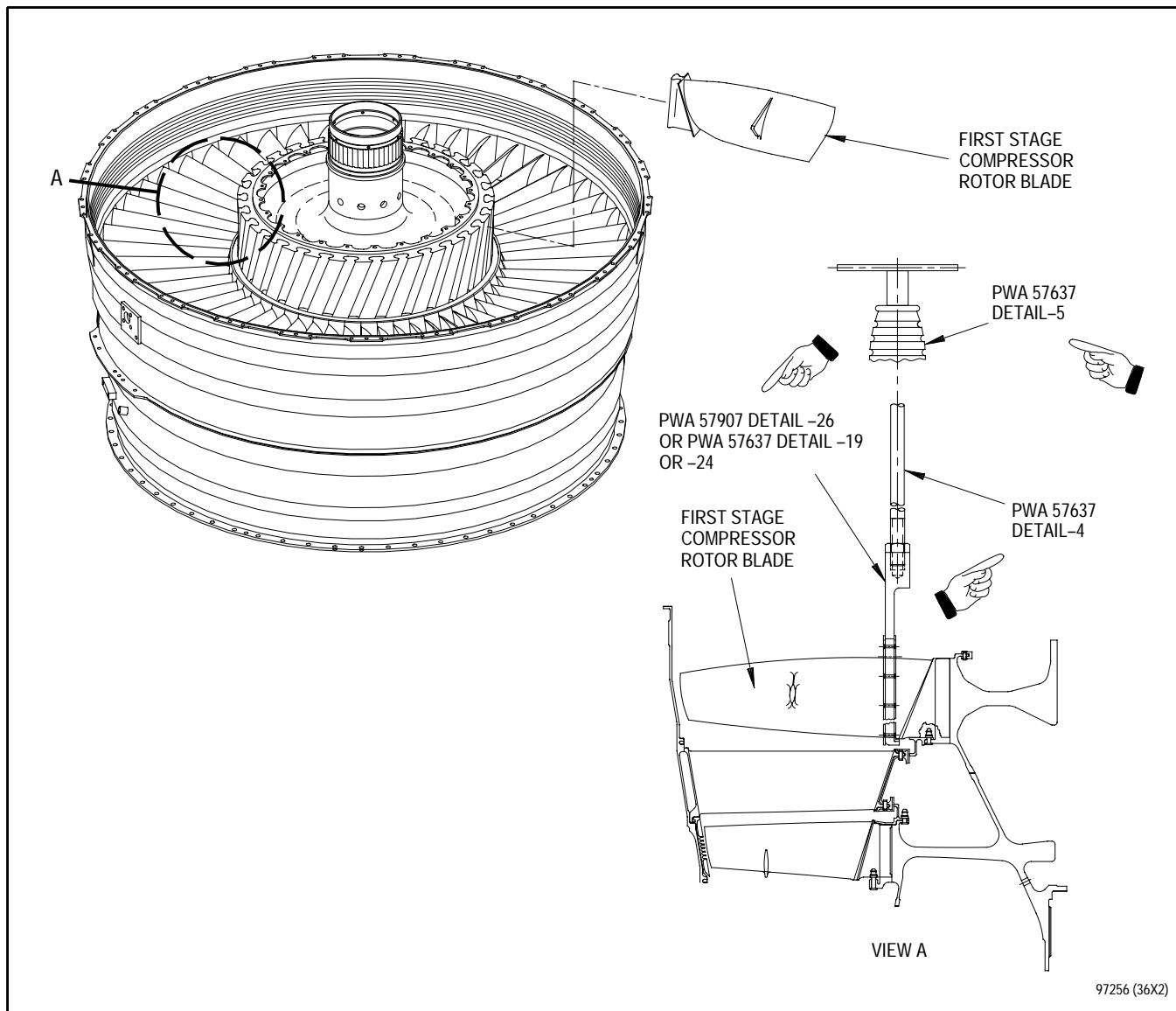


Figure 1A. First Stage Compressor Rotor Blades - Removal Using PWA 57907 or PWA 57637 Puller Set

3. FIRST STAGE FAN AIR SEAL AND FIRST STAGE COMPRESSOR STATOR ASSEMBLY - REMOVAL.

(See Figure 2.)

- a. Determine if air seal(1, figure 2) has a tight forward snap diameter with fan case, using 0.001 inch feeler stock. If feeler stock cannot be inserted between air seal forward snap diameter and case, tooling in step c. is required to remove air seal.
- b. Remove first stage fan air seal(1), using PWA 57637 puller as follows:
 - (1) Install five PWA 57637 puller detail-23-3 studs(12) into detail-23-1 puller assembly(9).
 - (2) Retract and lock three detail-23-2 pins(10) using detail-23-11 dowel pins(11).



Failure to use PWA 57637 puller carefully can result in damage to first stage fan air seal.

- (3) Carefully install puller assembly(9) onto fan air seal(1) aligning three puller holes in seal with three pins on puller assembly.

- (4) Unlock three pins(10).
- (5) Ensure three pins are fully engaged into fan air seal by applying upward pressure on puller assembly.
- (6) Place detail-17-1 plate(6) over studs(12) aligning locations marked 'A' on plate and puller assembly.
- (7) Engage detail-17-2 swing-C washers(7) onto studs(12) and secure with detail-17-3 flange nuts(8) fingertight.
- (8) Gradually tighten every other flange nut(8) to unseat fan air seal.
- (9) Remove flange nuts(8), release swing-C washers(7) and remove plate(6) from fan case
- (10) Remove fan air seal(1) by using two handles on puller assembly(9).
- (11) Remove studs(12) from puller assembly(9).
- (12) Remove puller assembly(9) from fan air seal(1) by retracting pin(10) and locking into position.

NOTE

Procedure in step c. will remove all configuration fan air seals.

c. Remove first stage fan air seal(1), using PWA 57907 puller set or combination of PWA 57801 and PWA 57637 puller sets as follows:

- (1) Install five PWA 57907 detail-18 or PWA 57637 detail-23-3 studs(12) into PWA 57801 detail-16-1 plate(14).
- (2) Verify that pins are retracted. If not, retract and lock six pins(10) using dowel pins(11).



Failure to use PWA 57907 puller set or PWA 57801 and PWA 57637 puller sets carefully can result in damage to first stage fan air seal.

- (3) Install plate(14) onto fan air seal(1) aligning six puller holes in fan air seal with six pins on puller assembly. If older configuration air seal (three hole) is installed, align three holes and three pins.
- (4) Unlock three or six pins(10), as required.
- (5) Ensure pins are fully engaged into fan air seal by applying upward pressure on puller assembly.

- (6) Place PWA 57801 detail-16-10 spacer (13) on fan case.
- (7) Install PWA 57637 detail-17 plate(6) over spacer(13), aligning locations marked A.
- (8) Engage swing-C washers(7) onto studs(12) and secure with flange nuts(8) fingertight.

NOTE

Tip shroud must travel 2.4 inches before forward snap diameter is unseated and air seal is free to be removed from case.

- (9) Gradually tighten every other flange nut(8) to unseat fan air seal.
- (10) Loosen flange nuts(8), release swing-C washers(7) and remove plate(6) from fan case.
- (11) Remove plate(14) and fan air seal(1) together from case.
- (12) Remove puller assembly(14) from fan air seal(1) by retracting pin(10) and locking into position.
- (13) Remove studs(12) from puller assembly(14).
- (14) Remove spacer(13) from fan case.

- d. Install protective covering on air seal.
- e. Remove 1st stage compressor stator lock ring(2).
- f. Carefully install PWA 57637 detail-9 puller assembly(4) onto 1st stage compressor stator assembly(3).
- g. Push down on puller assembly(4) at handle locations to engage fingers into stator(3) OD slots.
- h. Turn puller clockwise to lock fingers into position. Lock puller by pushing down on lock tab.
- k. Engage detail-17-2 swing-c washers(7) onto studs(5) and secure with detail-17-3 flange nuts(8) fingertight.
- l. Gradually tighten flange nuts(8) using alternating pattern to unseat first stage compressor stator assembly(3).
- m. Remove detail-17-1 plate.
- n. Carefully remove stator assembly(3) using two technicians and place on bench.



Failure to ensure careful 1st stage compressor stator assembly removal can lead to ID rubstrip damage.

- i. Install five PWA 57907 detail-18 or PWA 57637 detail-18 studs(5) into puller assembly(4).
- j. Place detail-17-1 plate(6) over studs(5) ensuring alignment of holes, and lower onto fan case.

Legend for figure 2

- 1. First stage fan air seal
- 2. Compressor stator lock
- 3. First stage compressor stator assembly
- 4. First stage stator puller
- 5. Stud
- 6. Plate
- 7. Swing-C washer
- 8. Flange nut
- 9. Puller assembly
- 10. Pin
- 11. Dowel pin
- 12. Stud
- 13. PWA 57801 detail-16-10 spacer
- 14. PWA 57801 detail-16-1 puller assembly

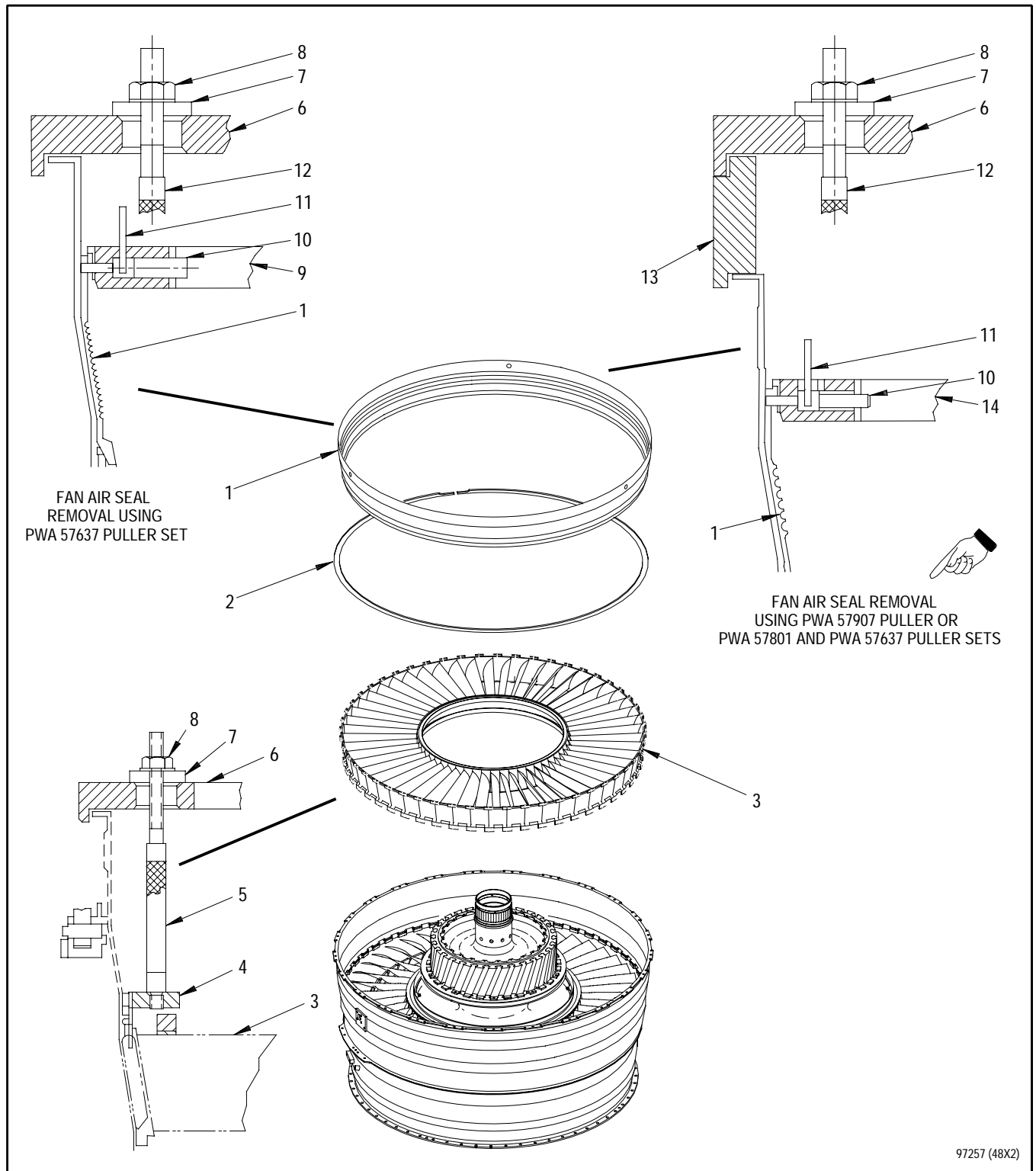


Figure 2. First Stage Fan Air Seal and First Stage Compressor Stator Assembly - Removal

4. SECOND STAGE COMPRESSOR ROTOR BLADES - REMOVAL.

(See Figures 3 and 3A.)

- a. Remove rivet pins(2, figure 3) and rivet pin collars(1) securing air seal(3) to drum rotor assembly(5) by holding rivet pins with standard hexhead wrench and unscrewing collars with box wrench. Discard rivet pins and collars.

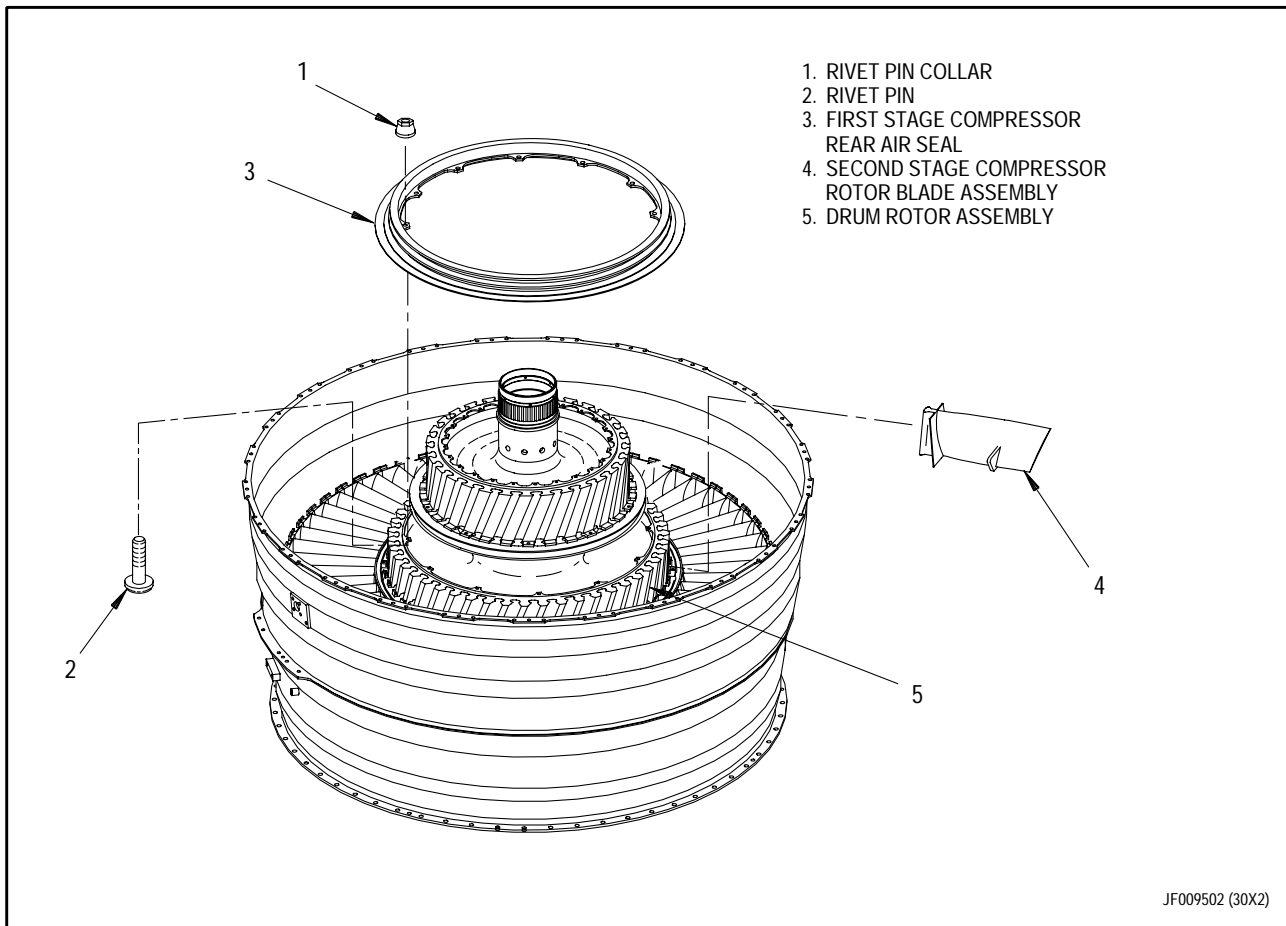


Figure 3. Second Stage Compressor Rotor Blades - Removal

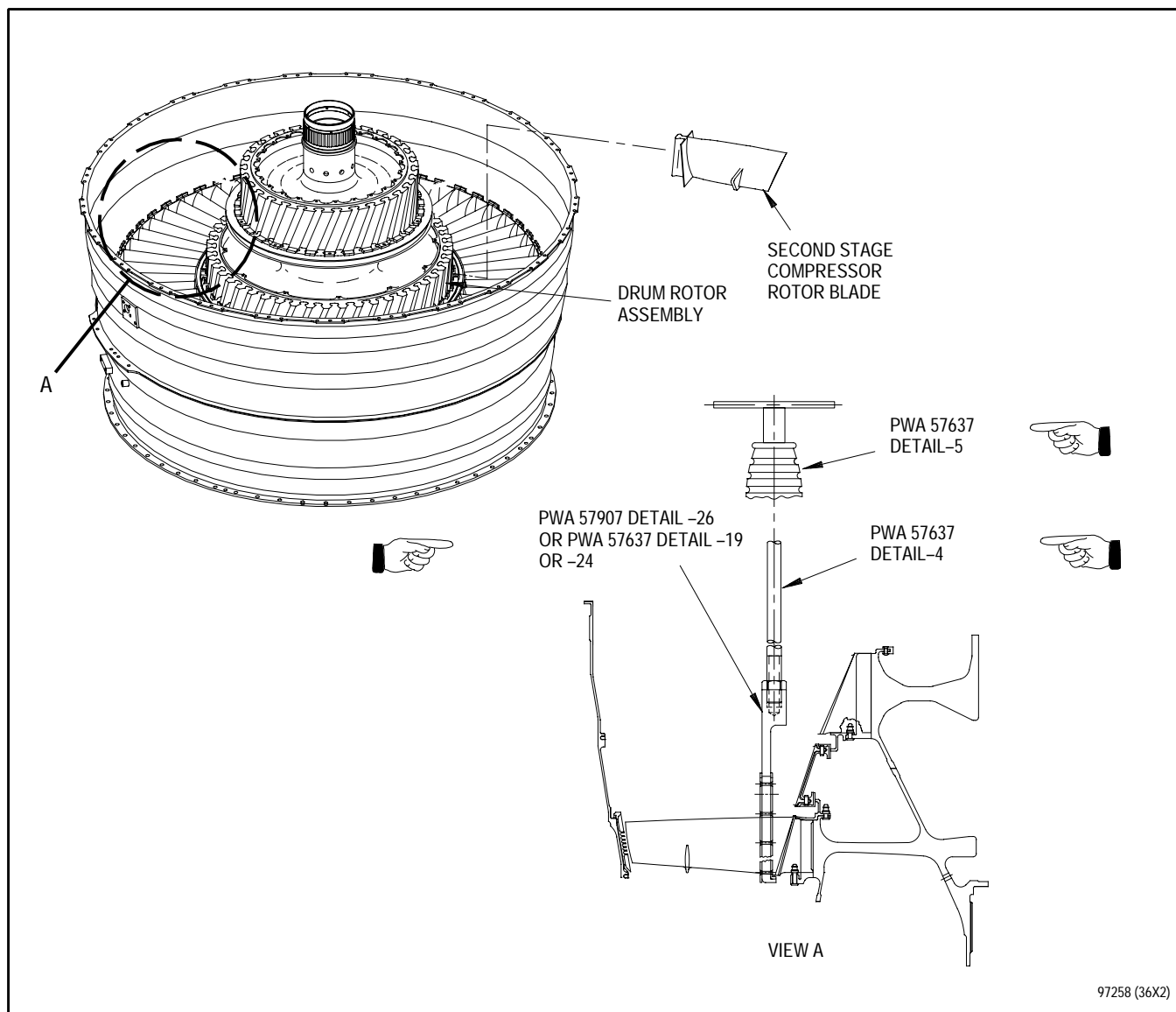


Figure 3A. Second Stage Compressor Rotor Blades - Removal Using PWA 57907 or PWA 57637 Puller Set

- b. Install PWA 57637 detail-2 puller on air seal(3) and secure puller using hand knob. Slide tool to various positions around air seal while using knocker to gradually remove air seal. Remove puller.
- c. Install protective covering on air seal.



Failure to properly remove blades according to following procedures can result in nonreparable blade damage.

NOTE

Due to mid-span shroud of blades, any one blade cannot be removed from drum rotor without removing all blades of assembly.

- d. Carefully remove blades in a clockwise direction, progressively moving blades out of drum rotor a little at a time until all blades can be manually removed. Place blades into PWA 71458 fixture, blade root up. If necessary, PWA 57907 or PWA 57637 puller set may be used to remove blades, as follows:
 - (1) Assemble PWA 57637 details-4, -5, and PWA 57907 detail-26 or PWA 57637 detail-19 or-24.
(See figure 3A.)
 - (2) Insert puller fork over blade airfoil with tangs toward inside diameter of hub.
 - (3) Slide tool inboard until tangs are located under blade root platform.
(See figure 3A.)
 - (4) Use upward stroke of detail-5 puller hammer to loosen blade.
- e. Mark total low cycle fatigue cycles on all removed blades per T.O. 2J-F100-53-6, WP 015 00.

5. SECOND STAGE FAN AIR SEAL AND SECOND STAGE COMPRESSOR STATOR ASSEMBLY - REMOVAL.

(See Figure 4.)

- a. Attach PWA 57637 detail-3 puller(10) onto detail-15 extension. Lip of detail-3 puller should face down. Attach detail-15 extension onto assembled detail-4 rod assembly and detail-5 puller hammer. Position detail-3 over 2nd stage fan air seal(1, figure 4).
- b. While holding puller against air seal with one hand, use other hand to exert light upward knocker action of detail-5 puller hammer. Move puller to various positions around air seal, using knocker action to gradually and evenly remove air seal.
- c. Install protective covering on air seal.
- d. Remove 2nd stage compressor stator lock ring(2).

- e. Install PWA 57637 puller detail-10 puller(5) onto 2nd stage compressor stator assembly(3).
- f. Push down on detail-10 puller(5) at handle locations to engage fingers into stator(3) OD slots.
- g. Turn puller clockwise to lock fingers into position. Lock puller by pushing down on lock tab.
- h. Install five detail-21 studs(6) into detail-10 puller assembly(5).
- i. Place detail-17-1 plate(7) over detail-21 studs(6) ensuring alignment of holes, and lower onto fan case.
- j. Engage detail-17-2 swing-c washers(8) onto detail-21 studs(6) and secure with detail-17-3 nuts(9) fingertight.
- k. Gradually tighten detail-17-3 flange nuts(9) using alternating pattern to unseat second stage compressor stator assembly(3).
- l. Carefully remove stator assembly(3) using two technicians and place on bench.
- m. Remove tooling.

Legend for figure 4

- 1. Second stage fan air seal
- 2. Compressor stator lock
- 3. Second stage compressor stator assembly
- 4. Deleted
- 5. Second stage stator puller
- 6. Stud
- 7. Plate
- 8. Swing-C washer
- 9. Flange nut
- 10. Puller assembly

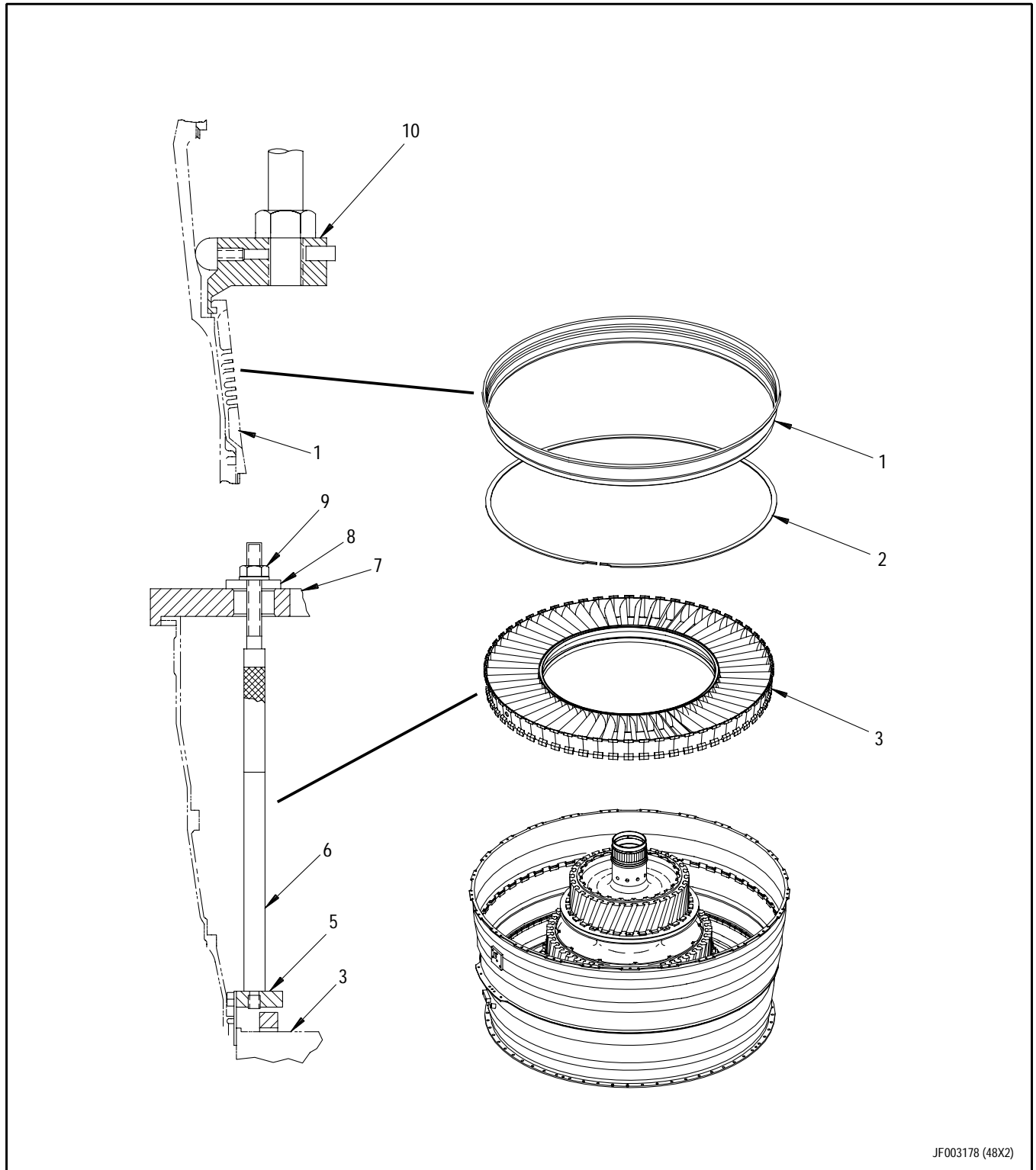
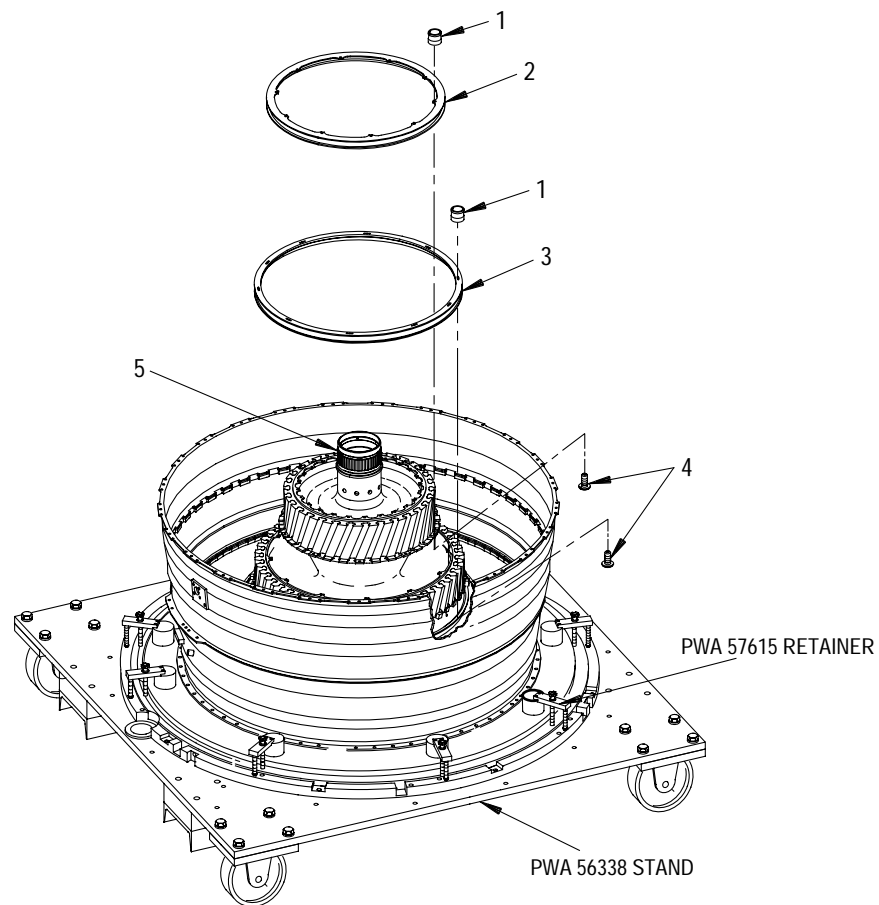


Figure 4. Second Stage Fan Air Seal and Second Stage Compressor Stator Assembly - Removal

**6. FIRST AND SECOND STAGE COMPRESSOR
AIR SEALS - REMOVAL.**

(See Figure 5.)

- a. Remove rivet pins(4) and rivet pin collars(1) securing air seal(2) to drum rotor assembly(5) by holding rivet pins with standard hexhead wrench and unscrewing collars with box wrench. Discard rivet pins and collars.
- b. Remove air seal(2) using PWA 57637 puller detail-1 puller as follows:
 - (1) Install puller detail onto rear side of air seal.
 - (2) While holding puller against air seal with one hand, use other hand to exert light knocker action. Move puller to various positions around air seal using knocker action to gradually remove air seal.
- c. Install protective covering on air seal.
- d. Remove rivet pins(4) and rivet pin collars(1) securing air seal(3) to drum rotor assembly(5) by holding rivet pins with standard hexhead wrench and unscrewing collars with box wrench. Discard rivet pins and collars.
- e. Remove air seal(3) using PWA 57637 puller detail-1 puller as follows:
 - (1) Attach detail-1 puller onto detail-15 rod extension and detail-4 rod assembly.
 - (2) Install puller detail to rear side of air seal.
 - (3) While holding puller against air seal with one hand, use other hand to exert light knocker action. Move puller to various positions around air seal using knocker action to gradually remove air seal.
- f. Install protective covering on air seal.



JF003176 (36X2)

1. Rivet pin collar
2. First stage compressor front air seal
3. Second stage compressor front air seal
4. Rivet pin
5. Drum rotor assembly

Figure 5. First and Second Stage Compressor Air Seal - Removal

**7. FRONT COMPRESSOR DRUM ROTOR -
REMOVAL.**

(See Figure 6.)

- a. Install PWA 57803 front retainer onto front of drum rotor assembly as follows:

- (1) Install protectors on 1st and 2nd stages of drum rotor.
- (2) Thread detail-3 nut onto detail-2 shaft until bottom of nut is approximately 1 inch above end of threads on shaft detail.
- (3) Install detail-2 shaft and lower detail-3 nut onto drum rotor front hub.

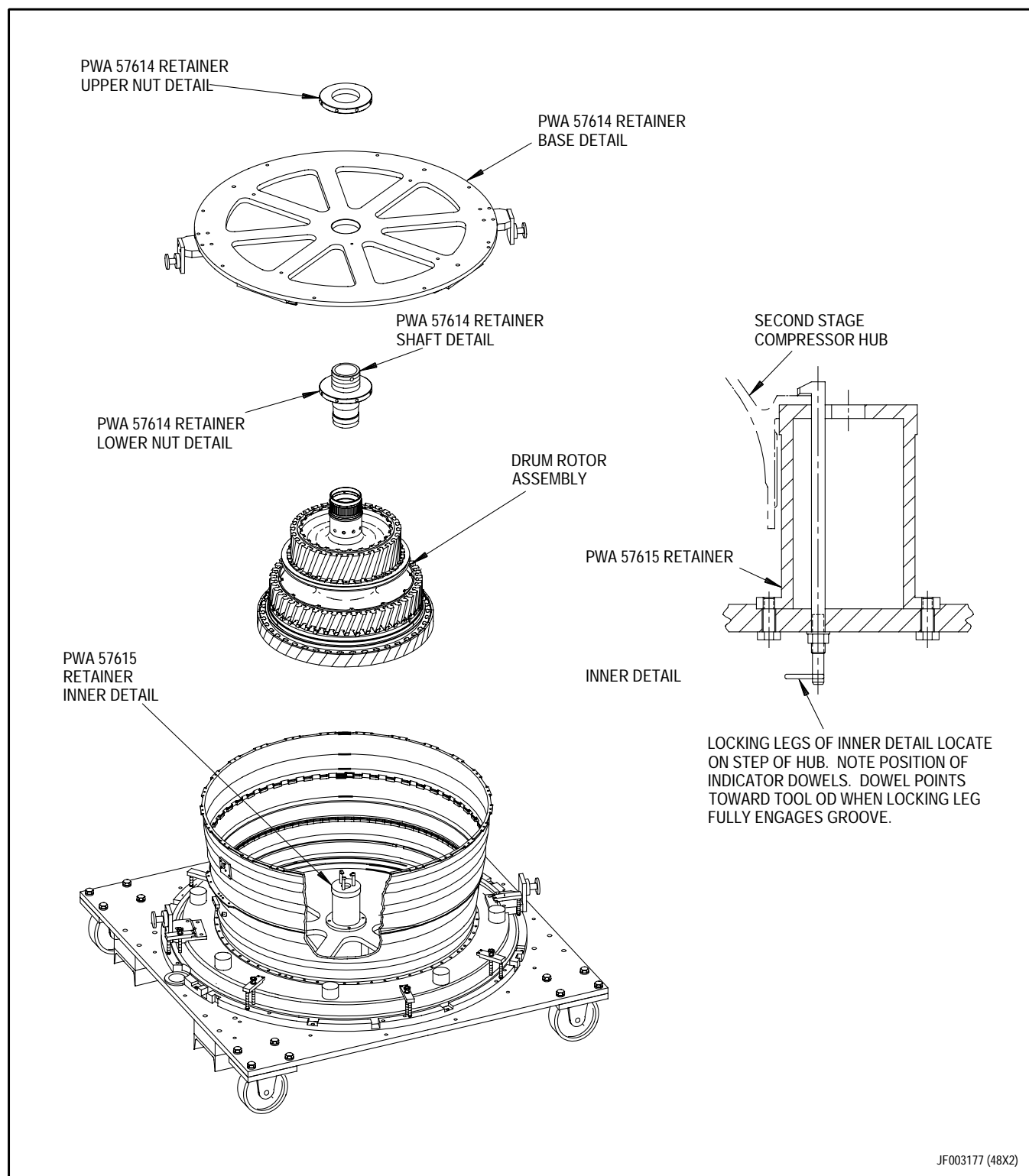
NOTE

- PWA 57803 retainer contains PWA 57614 details.
- Two technicians are required for installation of PWA 57614 detail-1.

- (4) Attach PWA 26147 lifting adapters, PWA 56336 sling, PWA 2388 safety hook, and overhead hoist to PWA 57614 detail-1 base. Install detail-1 base slide jaw details facing down, onto shaft detail.

- (5) Raise lower nut detail and base detail until feet on base detail are above shaft detail. Secure with upper nut detail-3.

- b. Unlock inner detail locking legs of PWA 57615 rear retainer. See figure 6.
- c. Remove front compressor drum rotor and place on suitable storage container.
- d. Install suitable protectors on blade slots.

**Figure 6. Front Compressor Drum Rotor - Removal**

8. FAN CASE AND THIRD STAGE FAN AIR SEAL - REMOVAL.

(See Figure 7.)

- a. Remove 3rd stage fan air seal(1, figure 7) using PWA 57637 puller detail-3 puller as follows:

- (1) Install detail-3 puller lip side down, onto detail-15 rod extension and detail-4 rod assembly.
- (2) Install lip of detail into air seal OD groove. Ensure positive engagement by applying sufficient pressure against bumper of detail and ID of fan case.

- (3) While holding puller against air seal with one hand use other hand to exert light knocker action. Move puller to various positions around air seal using knocker action to gradually remove air seal.

- b. Install protective covering on air seal.
- c. Using two technicians, remove fan case(2) from rear retainer by removing cap screw and assemblies(3).

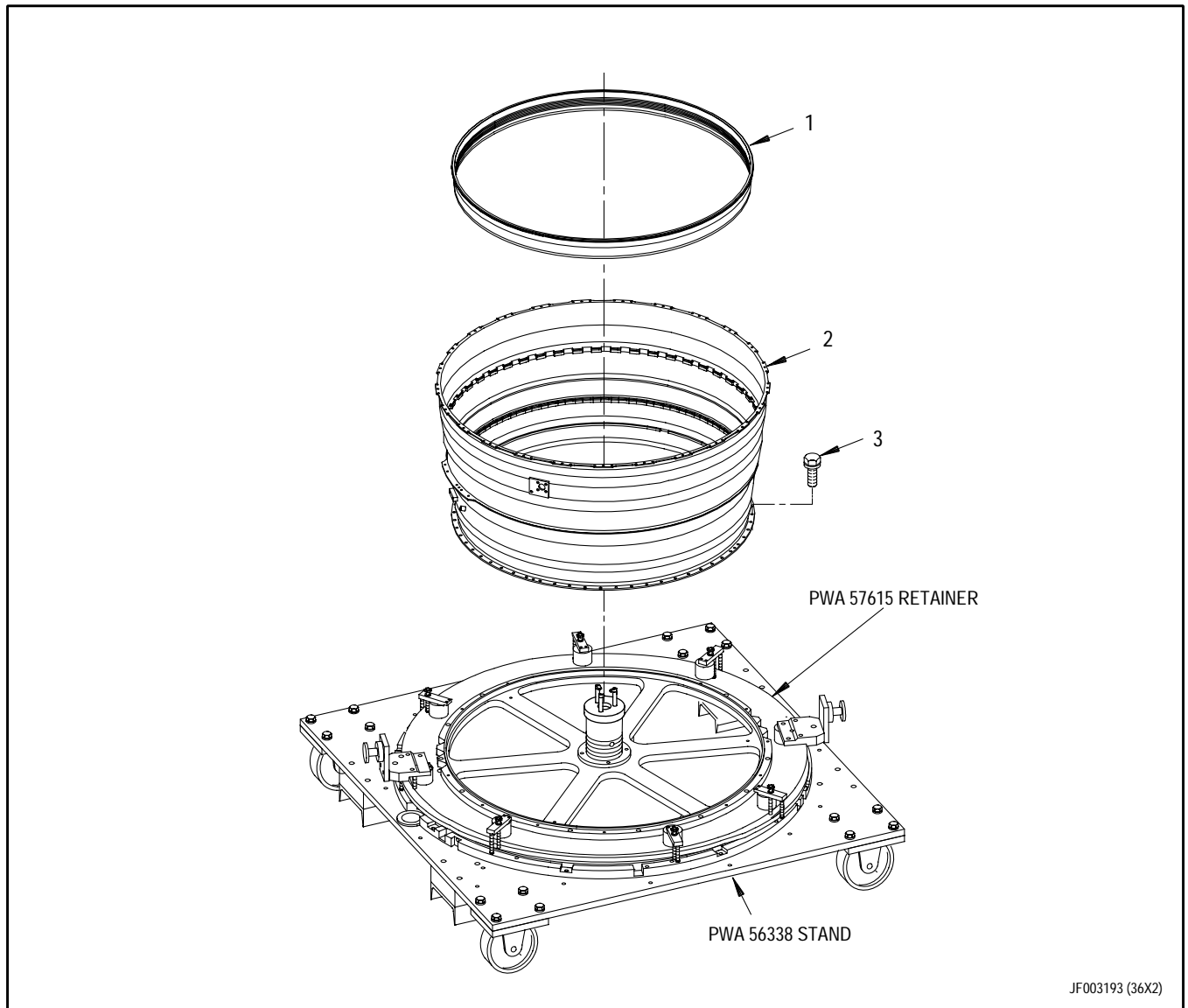


Figure 7. Outer Fan Case and Third Stage Fan Air Seal - Removal

WORK PACKAGE

TECHNICAL PROCEDURES

INLET/FAN MODULE - SERVICE CYCLE MARKING

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
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1 - 6 0

REFERENCE MATERIAL REQUIRED

Title	Number
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
Marking, General - - - - -	WP 023 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for service cycle marking of inlet/fan module 1st, 2nd, and 3rd stage compressor blades.

2. SERVICE CYCLE MARKING OF FIRST, SECOND, AND THIRD STAGE COMPRESSOR BLADES.

(See Figure 1 and Table 1.)

NOTE

- Service cycle marking of blades shall be done immediately after removal.
 - All new blades shall be marked prior to installation into drum rotor assembly.
 - Stages not requiring maintenance should not be disassembled solely for the purpose of marking cycles.
 - Total equivalent cycles (TEC) are recorded on inlet/fan module significant historical record, AFTO form 95.
- a. If blades removed from disks have been previously marked, determine total equivalent cycles. To calculate total equivalent cycles, add the previous number of cycles on blade to the number of cycles accumulated since last blade installation. Refer to blade replacement record as required.

NOTE

The T symbol indicates an unknown amount of cycles.

- b. If blades removed from disk have a T symbol marking, mark out the T symbol and substitute 4000 cycles for the unknown amount. Refer to Table 1, blade No. 3, for an example.

- c. Mark first, second, or third stage compressor blades as required on front face of blade root. See figure 1. Rear face of blade root can be used only if there is not sufficient area on front face. Mark blades as follows:

- (1) Use vibration peening method of marking. Do not exceed 0.006 inch depth. Refer to T.O. 2J-F100-53-1, WP 023 00.
- (2) Ensure that code marking is legible. Begin in upper left corner and provide space for maximum quantity of symbols to be marked. Use character size of 0.125 inch maximum. Do not allow markings to extend into radii, chamfers, sharp edges, or fillets.
- (3) Mark blades using codes established in table 1. Total accumulated cycles are shown on latest code marked on blade root. Therefore, addition of previously marked codes is not necessary.

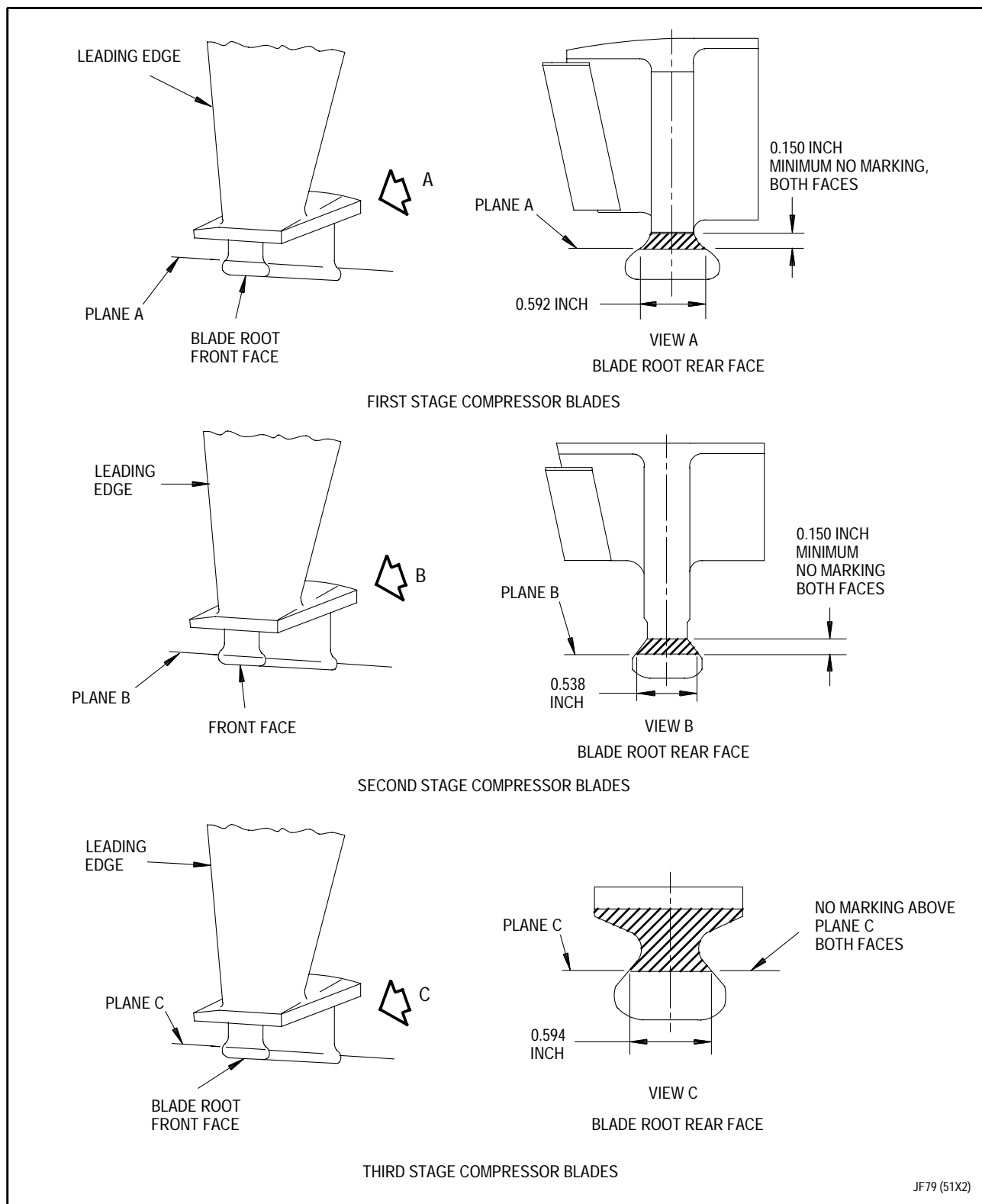


Figure 1. Service Cycle Marking of First, Second, and Third Stage Compressor Blades

- d. Annotate appropriate AFTO 95 historical record just before installation of blades into disk with the following information:

- (1) Under installation data, record the following:
1. Activity accomplishing blade replacement
 2. Inlet/fan module serial number
 3. Date
 4. Installation time in Total Operating Hours
 5. Total equivalent cycles for both assembly and blade with highest number of cycles.

Table 1. Service Cycle Marking Code

SYMBOL	CYCLES	SYMBOL	CYCLES	SYMBOL	CYCLES
◇	0 NEW	<u>B</u>	1200-1400	<u>C</u>	2800-3000
T	UNKNOWN	<u>B</u>	1400-1600	D	3000-3200
A	0-200	<u>B</u>	1600-1800	<u>D</u>	3200-3400
<u>A</u>	200-400	<u>B</u>	1800-2000	<u>D</u>	3400-3600
<u>A</u>	400-600	C	2000-2200	<u>D</u>	3600-3800
<u>A</u>	600-800	<u>C</u>	2200-2400	<u>D</u>	3800-4000
<u>A</u>	800-1000	<u>C</u>	2400-2600		
B	1000-1200	<u>C</u>	2600-2800		
CONTINUE IN LIKE MANNER WITH E, F, G,.....AS REQUIRED					

EXAMPLE OF SYMBOLS MARKED ON THREE BLADES FROM DIFFERENT MODULES:

BLADE NO.1: ◇ B = 1200-1400 CYCLES
THIS BLADE HAD BEEN A NEW SPARE.

BLADE NO.2: A B = 1200-1400 CYCLES
THIS BLADE HAD BEEN PREVIOUSLY MARKED AT 600-800 CYCLE PERIOD.

BLADE NO. 3: T B C = 2400-2600 CYCLES PLUS SOME UNKNOWN AMOUNT.
THIS BLADE HAD BEEN A USED, SERVICEABLE BLADE OF UNKNOWN CYCLES WHEN FIRST INSTALLED. IT HAD ALSO BEEN REMOVED AND MARKED AT 1200-1400 CYCLES PERIOD.

⌘ B C G = 6400-6600 CYCLES, 4000 CYCLES SUBSTITUTED FOR UNKNOWN AMOUNT.
THIS SHOWS THE BLADE HAD 2400-2600 CYCLES PLUS SOME UNKNOWN AMOUNT OF CYCLES. 4000 CYCLES WERE ADDED FOR THE UNKNOWN AMOUNT AND THE UNKNOWN SYMBOL WAS MARKED OUT.

WORK PACKAGE

INTRODUCTION

INLET/FAN MODULE -

DISASSEMBLY OF SUBASSEMBLIES

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2					0

1. INTRODUCTION.

This work package introduces the 020 00 through 199 00 series of work packages, the disassembly of subassemblies for the Inlet/Fan Module. The following work packages are included in this series:

WP No.	Title
021 00	Case Assembly, Fan Inlet - Disassembly
022 00	Housing Assembly, No. 1 Bearing, (Seal Assembly, Face, No. 1 Bearing; and Seal Ring) - Disassembly
023 00 through 199 00	Open

WORK PACKAGE

TECHNICAL PROCEDURES

CASE ASSEMBLY, FAN INLET -

DISASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	19	5 - 6A	9	7	19
3	9	6B Blank	4	8	0
4	0				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
DYE, LAYOUT (PMC 4062)	MICRO-SUPREME (PURPLE) MICHROME & CHEM CO.

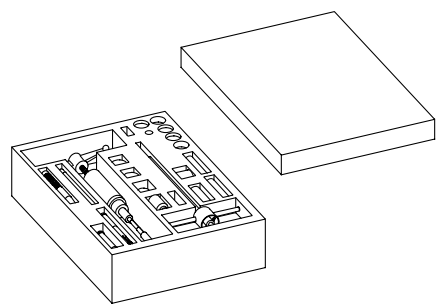
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
3	FRONT COMPRESSOR STATOR INLET SHROUD AND FRONT COMPRESSOR STATOR VARIABLE INLET VANES - REMOVAL	
	PUSHER/PULLER, INLET GUIDE VANE OUTER BUSHINGS - -	PWA 57790

ILLUSTRATED SUPPORT EQUIPMENT



PWA 57790 -C

Figure T1. PWA 57790 PUSHER/PULLER

1. INTRODUCTION.

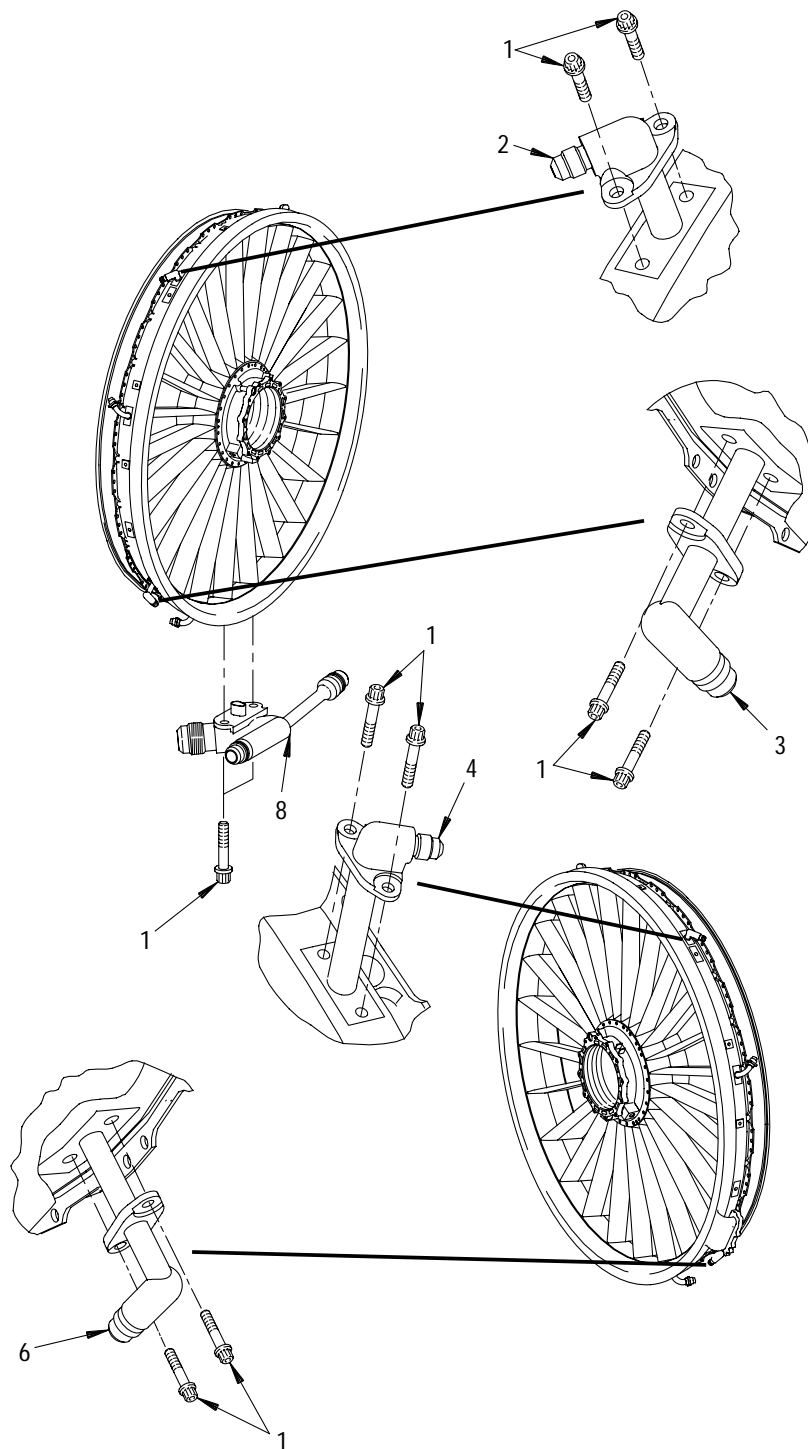
- a. This work package contains instructions for disassembly of fan inlet case assembly.

2. NO. 1 BEARING HOUSING ASSEMBLY - REMOVAL.

(See Figures 1 and 2A.)

- a. Position fan inlet case front end up on wooden supports large enough to prevent damage to No. 1 bearing housing assembly, variable vanes, inlet shroud, and fan inlet case.

- b. Install a suitable protector into No. 1 bearing housing.
- c. Remove bolts(1) securing scavenge tube elbows(3, 6, and 8), pressure tube elbow(2), and Ps2 tube elbow(4) to fan inlet case OD.
- d. Deleted



JF003175 (48X2)

Figure 1. No. 1 Bearing Oil Scavenge Tube Assemblies, Scavenge Tube Elbows, Pressure Tube Elbow, and Ps2 Elbow - Removal

Legend for figure 1

1. Bolt
2. Pressure tube elbow
3. Scavenge tube elbow
4. Ps2 tube elbow
5. Deleted
6. Scavenge tube elbow
7. Deleted
8. Scavenge tube elbow

e. Remove No. 1 bearing housing assembly as follows: (See figure 2A.)



Pressure, scavenge, and Ps2 tubes do not come out of fan inlet case and shall not be rotated to prevent damage.

- (1) Pull pressure(9), scavenge(5, 6, and 7), and Ps2(2) tubes outward away from housing(1) until they stop. Ensure tube ID ends clear housing. Secure temporarily.
- (2) Remove lockwire from heads of bolts(3).
- (3) Remove all but one bolts(3).

(4) Loosen remaining bolt, leaving enough thread engagement to ensure that housing will be held after breaking snap diameter.

(5) Break snap diameter using three PN ST2016-16 (or equivalent) jackscrews. Remove jackscrews.

NOTE

No. 1 bearing seal assembly is removed with No. 1 bearing housing assembly.

(6) Remove remaining bolt while holding housing. Remove housing from rear of fan inlet case.

f. Place housing with carbon seal(10) facing up on a workbench.

T.O. 2J-F100-53-6

WP 021 00

- g. Remove and discard packings(4) from fan inlet case ID ends of pressure and scavenge tubes.
- h. If no further maintenance is necessary, store housing in container to protect carbon seal face assembly.
- i. Disassemble housing per WP 022 00.

Figure 1A. Deleted.

Figure 2. Deleted.

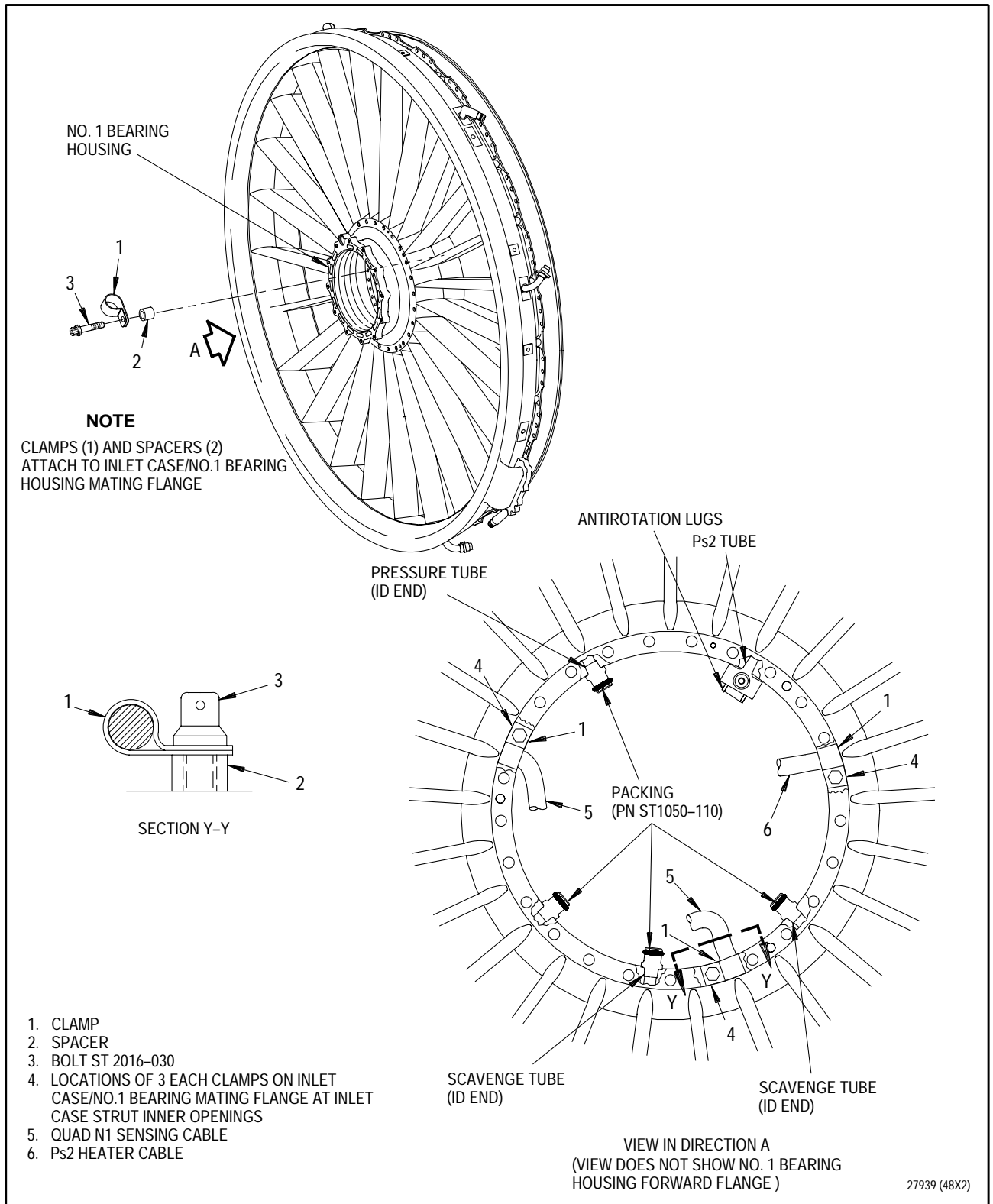


Figure 2A. No. 1 Bearing Housing - Removal

3. FRONT COMPRESSOR STATOR INLET SHROUD AND FRONT COMPRESSOR STATOR VARIABLE INLET VANES - REMOVAL.

(See Figure 3.)

- a. Position fan inlet case front end down on a workbench.
- b. Remove bolts(1, figure 3) securing shroud(2) to ID of fan inlet case.
- c. Tap shroud(2) with plastic mallet and remove shroud(2).
- d. Lift variable vanes(4) inward and out of fan inlet case.
- e. Remove variable vane ID bearing(3) from variable vanes(4).
- f. Remove variable vane OD bearing(5) from fan inlet case(7) as follows:
 - (1) Install detail-22 drift(6) of PWA 57790 pusher/puller kit into OD bearing(5) from outside of fan inlet case(7).
 - (2) Remove OD bushings(5) by using light tapping action on drift(6) with light, nonmetallic mallet.

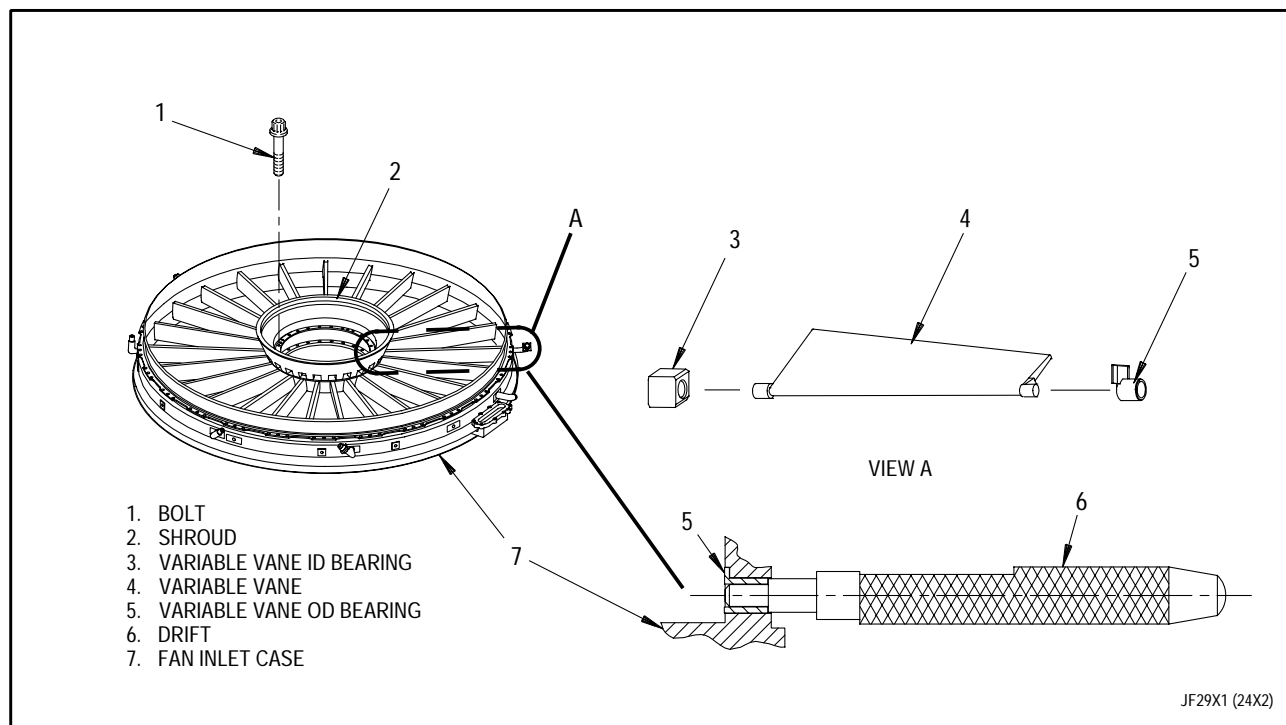


Figure 3. Front Compressor Stator Inlet Shroud and Front Compressor Stator Variable Inlet Vanes - Removal

WORK PACKAGE

TECHNICAL PROCEDURES

HOUSING ASSEMBLY, NO. 1 BEARING,
(SEAL ASSEMBLY, FACE, NO. 1 BEARING; AND SEAL RING) -

DISASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4					0

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for disassembly of the No. 1 bearing housing assembly.

2. PRELIMINARY INSTRUCTIONS.

- a. Remove No. 1 bearing housing assembly from fan inlet case per T.O. 2J-F100-53-6, WP 021 00.

3. NO. 1 BEARING SEAL FACE ASSEMBLY AND SEAL RING - REMOVAL.

(See Figure 1.)

- a. Place No. 1 bearing housing assembly on bench with carbon seal face up. Refer to figure 1, sheet 1.
- b. Compress seal face assembly using fiber or plastic straight edge and carefully remove cotter pins. Discard cotter pins.

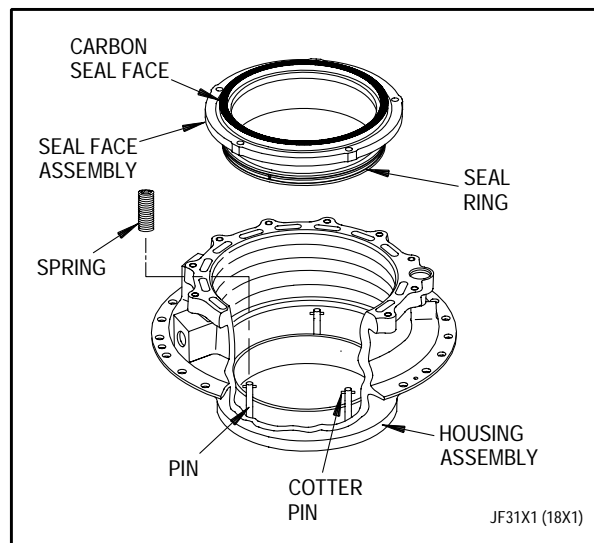


Figure 1. No. 1 Bearing Seal Face Assembly and Seal Ring - Removal

NOTE

Seal ring is removed with seal face assembly.

- c. Carefully lift seal face assembly from housing assembly.



Improper handling and storage of seal ring can result in damage to polished sealing surface.

- d. Carefully remove seal ring from seal face assembly. Store in container.

- e. Temporarily protect carbon seal face as follows:

- (1) Place seal face assembly between two pieces of styrofoam slightly larger than seal face assembly.

- (2) Using tape, close open ends around seal face assembly and place in cardboard box.

- (3) For handling and shipping outside maintenance facility, seal face assemblies shall be individually boxed with a cardboard collar around carbon seal face.

- f. Store seal face assembly in clean container.

- g. Remove and discard springs from pins.

WORK PACKAGE

INTRODUCTION

INLET/FAN MODULE -

CLEANING

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2					0

1. INTRODUCTION.

This work package introduces the 200 00 through 299 00 series of work packages for the inlet/fan module - cleaning. The following work packages are included in this series:

WP No.	Title
201 00	Inlet/Fan Module - Cleaning
202 00	Open
through	
299 00	

WORK PACKAGE**TECHNICAL PROCEDURES****INLET/FAN MODULE -****CLEANING****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 34

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	31	14	17	22	3
2	17	15	0	23	0
2A - 2B Added	17	16 - 18	3	24 - 26	3
3 - 5	0	19	0	27	0
6	3	20	31	28 - 29	19
7 - 13	0	21	0	30 - 32 Added	17

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111
Introduction and General Information	T.O. 2J-F100-53-1

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Cheese cloth, unsized	CCC-C-440
Oil, lubricating (PWA 521, Type I)	MIL-L-7808
Solvent, petroleum	P-D-680, Type II

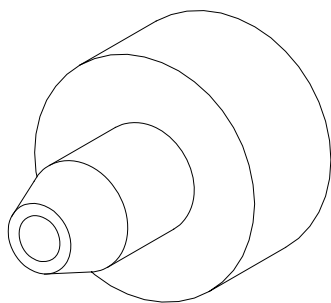
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

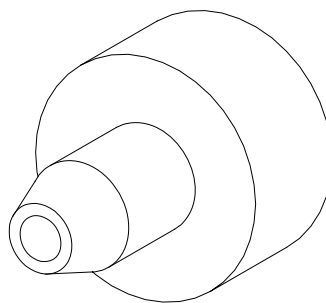
Paragraph	Function - Tool Nomenclature	Tool Number
7A	FRONT COMPRESSOR DRUM ROTOR DISK ASSEMBLY - REMOVAL OF COPPER NICKEL DEPOSITS FROM BLADE SLOTS PRIOR TO INSPECTION	
	MASK-PLUG, DISK DRUM ROTOR, FRONT COMPRESSOR, ASSY OF	PWA 71035
	MASK	PWA 71038
	MASK-PLUG, DISK DRUM ROTOR, FRONT COMPRESSOR, ASSY OF	PWA 71037
	EYE-LIFTING, DISK DRUM ROTOR FRONT ASSY	PWA 71096
	ADAPTER-REAR, LIFT, DISK DRUM ROTOR FRONT COMPRESSOR	PWA 71292
	HOLDER-BASKET, DISK DRUM ROTOR FRONT COMPRESSOR, ASSY OF	PWA 71293
	SLING-LIFT, DISK DRUM ROTOR FRONT COMPRESSOR, ASSY OF	PWA 71294

ILLUSTRATED SUPPORT EQUIPMENT



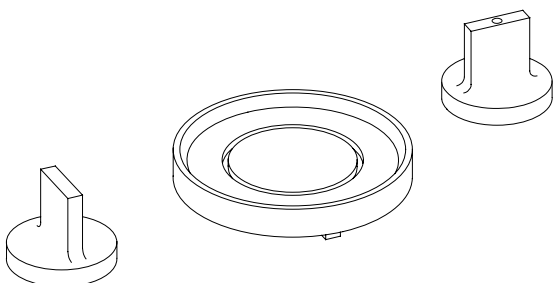
PWA 71035 -C

Figure T1. PWA 71035 MASK



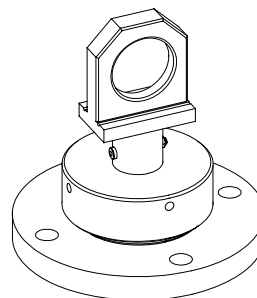
PWA 71037 -C

Figure T2. PWA 71037 MASK



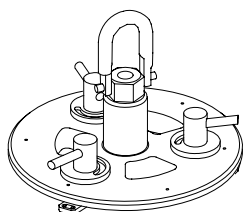
PWA 71038 -C

Figure T3. PWA 71038 MASK



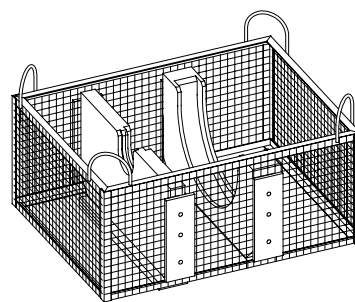
PWA 71096 -C

Figure T4. PWA 71096 EYE



PWA 71292 -C

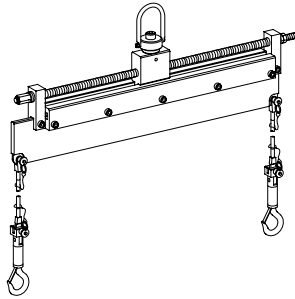
Figure T5. PWA 71292 ADAPTER



PWA 71293 -C

Figure T6. PWA 71293 HOLDER

ILLUSTRATED SUPPORT EQUIPMENT (continued)



PWA 71294 -C

Figure T7. PWA 71294 SLING

1. INTRODUCTION.

- a. This work package contains instructions for cleaning inlet/fan module parts.

2. GENERAL.



Do not use trichloroethylene degreasers on titanium parts. Any trichloroethylene that becomes trapped in the part could cause stress corrosion.

- a. General established cleaning methods and processes, such as degreasing, petroleum solvent cleaning, carbon removers, and certain abrasive blasts, may be used to clean parts of engine where extreme heat is not ordinarily encountered. For cleaning purposes, these parts may be considered as Cold Section parts.
- b. Comprehensive cleaning procedures are required to remove contamination and scales deposited on Hot Section parts. Among these procedures are chemical cleaning processes consisting of a series of carefully controlled acid and alkali baths and rinses. These may be specified separately or in certain combinations.

- c. Any method of cleaning selected by an operator shall meet all of following requirements in order to maintain parts durability:

- (1) It must be capable of cleaning parts sufficiently to ensure proper inspection by recommended methods.
- (2) Acid cleaning methods must not be used where there is any possibility that cleaning agent may become embedded and thus not completely removed during neutralizing process.
- (3) Cleaning process must not significantly alter physical character of part being cleaned.

- d. In order to avoid possibility of damage due to hydraulic action of residual oil, grease, preservative compound, or other liquids, ensure all blind holes into which studs, bolts, inserts, screw bushings, etc., will be driven, are thoroughly clean.

T.O. 2J-F100-53-6

WP 201 00

e. Refer to T.O. 2-1-111 for following information to use in conjunction with subsequent specific procedures:

- (1) Cleaning purposes.
- (2) Cleaning precautions.
- (3) Test and use of cleaning solutions.
- (4) Cleaning plated, welded, and hardcoated areas.

- (5) Decarbonizing.
- (6) Degreasing.
- (7) Descaling.
- (8) Soft grit blasting.
- (9) Wet abrasive blasting.
- (10) Antifriction bearing cleaning.

3. INLET FAN MODULE PARTS CLEANING.

(See Table 1.)

Table 1. Inlet/Fan Module Parts Cleaning

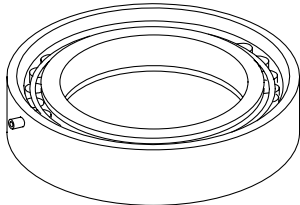
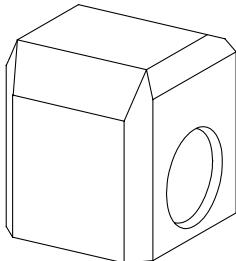
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
1. Bearing Assembly, roller, cylindrical, No. 1	 <p>PN 4018466 -C PN 4018466, 4018467, 4060870, or 4061549 PWA 725 Wrought Low Alloy Steel</p>	Refer to paragraph 3 T.O. 2-1-111 SPOP 14 SPOP 214	
2. Bearing, compressor stator, inlet	 <p>PN 4065512 -C PN 4065512 Carbon Fiber Reinforced Resin</p>	Water wash	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

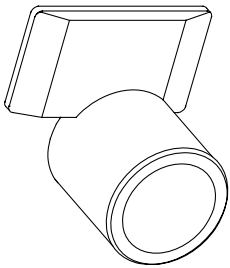
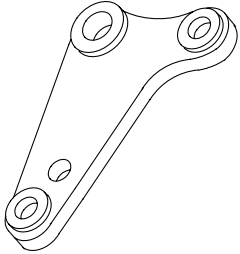
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
3. Bearing, compressor stator, inlet	 <p>PN4065513</p> <p>PN 4065513 Carbon Fiber Reinforced Resin</p>	Water wash	
4. Bell Crank Assembly, front compressor stator linkage, inlet	 <p>PN4065917</p> <p>PN 4065917 AMS 4928 or AMS 4911 Titanium Alloy</p>		WP 031 08

Table 1. Inlet/Fan Module Parts Cleaning (continued)

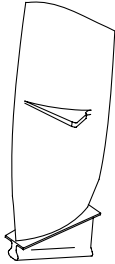
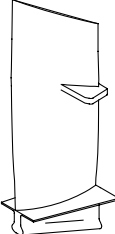
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
5. Blade Assembly, compressor rotor, 1st stage	 <p>PN 4066171 -C</p> <p> PN 4066171 PWA 1202 PN 4076781 PWA 1228 Titanium Alloy </p>		WP 031 04, WP 031 08
6. Blade Assembly, compressor rotor, 2nd stage	 <p>PN4066172</p> <p> PN 4066172 PWA 1202 PN 4076782 PWA 1228 Titanium Alloy </p>		WP 031 04, WP 031 08

Table 1. Inlet/Fan Module Parts Cleaning (continued)

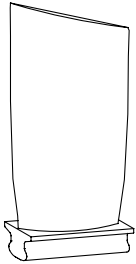
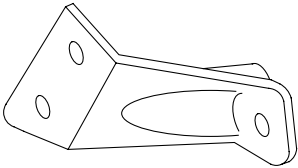
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
7. Blade, compressor rotor, 3rd stage	 <p>PN4067003</p> <p>PN 4067003 PWA 1202 Titanium Alloy</p>		WP 031 04, WP 031 08
8. Bracket, engine diagnostic unit, lower front	 <p>PN 4069482 -C</p> <p>PN 4069482 PWA 1264 Titanium Alloy</p>	Steam clean	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

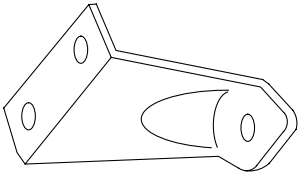
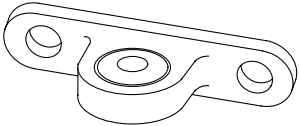
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
9. Bracket, engine diagnostic unit, upper front	 <p>PN 4069483 -C</p> <p>PN 4069483</p> <p>PWA 1264</p> <p>Titanium Alloy</p>	Steam clean	
10. Bracket, assembly, connecting link	 <p>PN 4069487 -C</p> <p>PN 4069487</p> <p>AMS 4928</p> <p>PWA-5-4928</p> <p>Titanium Alloy</p>	See paragraph 2.	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

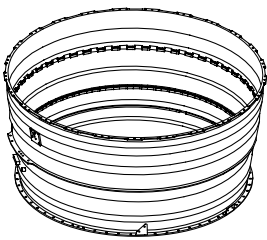
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
11. Deleted			
12. Case Assembly, fan	 <small>PN 4072388 -C</small> PN 4072388 AMS 4928 Titanium Alloy	Steam clean	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

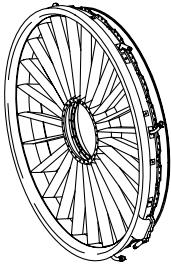
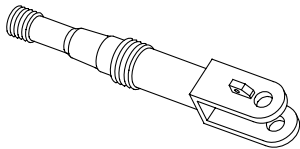
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
13. Case Assembly, fan inlet	 <p>PN4073196</p> <p>PN 4073196 AMS 4928 Titanium Alloy</p>	Steam clean	
14. Clevis, rod end	 <p>PN4075565 PN4075565 -C</p> <p>PN 4075565 AMS 4928 Titanium Alloy</p>	Steam clean	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

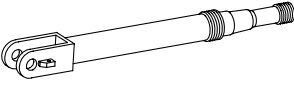
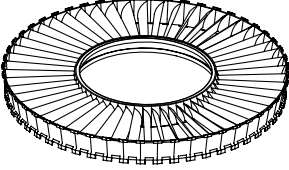
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
15. Clevis, rod end	 <p>PN4075566 PN4075566 -C</p> <p>PN 4075566 AMS 4928 Titanium Alloy</p>	Steam clean	
16. Compressor Stator Assembly, 1st stage	 <p>PN4074821</p> <p>PN 4074821 AMS 4928 Titanium Alloy</p>	Steam clean	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

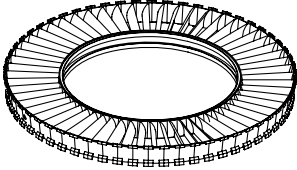
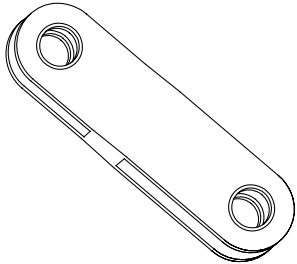
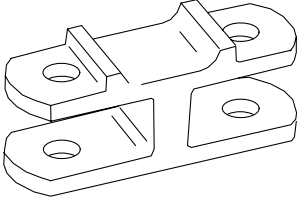
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
17. Compressor Stator Assembly, 2nd stage	 <p>PN4074822</p> <p>PN 4074822</p> <p>AMS 4928</p> <p>Titanium Alloy</p>	Steam clean	
18. Connecting Link, compressor stator, inlet	 <p>PN4069486</p> <p>PN 4069486</p> <p>AMS 4928</p> <p>Titanium Alloy</p>	Steam clean	
18A. Connecting Link, rigid, front compressor stator	 <p>PN 4026736 -C</p> <p>PN 4026736</p> <p>AMS 4928</p> <p>Titanium Alloy</p>	Steam clean	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

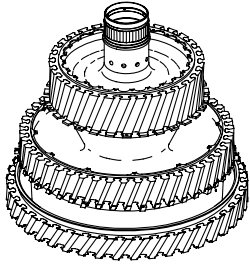
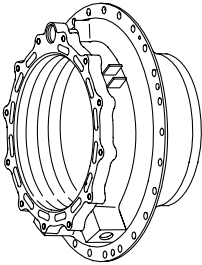
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
19. Disk Assembly, drum rotor, front compressor	 <p>PN4071223</p> <p>PN 4071223 PWA 1215 Titanium Alloy</p>	See paragraph 7A.	SWP 031 03, SWP 031 08
20. Housing, No. 1 bearing	 <p>PN4074825</p> <p>PN 4074825 PWA 1262-2 Titanium Alloy</p>		SWP 031 03, SWP 031 08

Table 1. Inlet/Fan Module Parts Cleaning (continued)

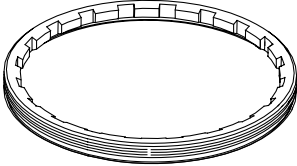
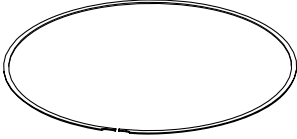
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
21. Inverted Nut, Spanner	 <p>PN4075121 PN4075121 -C</p> <p>PN 4075121 AMS 5616 SST</p>	Steam clean per paragraph 8.	
22. Lock, compressor stator	 <p>PN 4074738 -C</p> <p>PN 4074738 AMS 4928 Titanium Alloy</p>	Steam clean	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

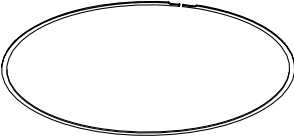
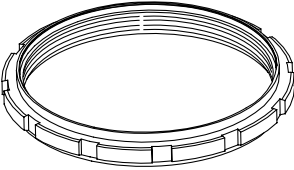
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
23. Lock, compressor stator	 <p>PN4074739 PN4074738</p> <p>PN 4074739 AMS 4928 Titanium Alloy</p>		WP 031 08
24. Nut, bearing retaining, internally threaded	 <p>PN4075122 PN4075122 -C</p> <p>PN 4075122 AMS 6322 or AMS 6323 Steel</p>	Steam clean per paragraph 8.	

Table 1. Inlet/Fan Module Parts Cleaning (continued)


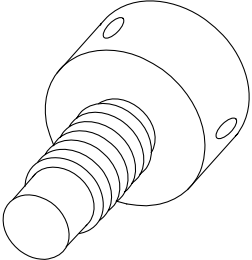
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
25. Nut, sleeve, hex	 <p>PN4075569 PN4075569 -C</p> <p>PN 4075569 AMS 4928 Titanium Alloy</p>	Steam clean	
26. Plug, borescope fan case, 2nd stage	 <p>PN4075766 PN4075766 -C</p> <p>PN 4075766 AMS 4928 Titanium Alloy</p>		WP 031 08

Table 1. Inlet/Fan Module Parts Cleaning (continued)

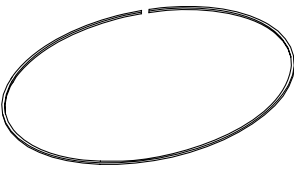
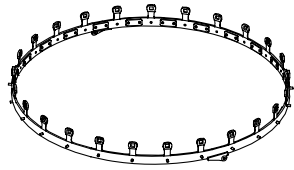
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
27. Ring, compressor blade lock, 3rd stage	 <p>PN4071224 PN4071224 -C</p> <p>PN 4071224 AMS 5596 AMS 5662 NI Alloy</p>		WP 031 08
28. Ring Assembly, synchronizing, front compressor, inlet	 <p>PN4072231</p> <p>PN 4072231 PWA 1260 Titanium Alloy</p>	Steam clean	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

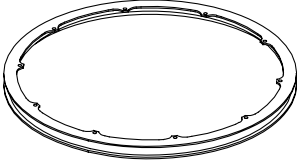
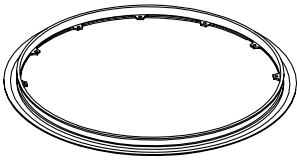
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
29. Seal, air, compressor, front, 1st stage	 <p>PN4071081</p> <p>PN 4071081 PWA 1215 Titanium Alloy</p>		WP 031 03, WP 031 08
30. Seal, air, compressor, rear, 1st stage	 <p>PN4071082</p> <p>PN 4071082 PWA 1215 Titanium Alloy</p>		WP 031 03, WP 031 08

Table 1. Inlet/Fan Module Parts Cleaning (continued)

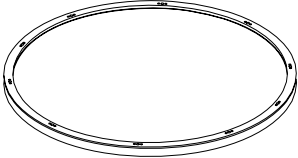
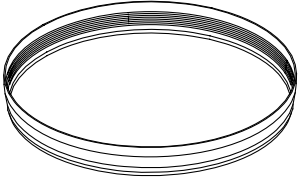
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
31. Seal, air, compressor, 2nd stage	 <p>PN 4083150</p> <p>PN 4083150 PWA 1215 Titanium Alloy</p>		WP 031 03, WP 031 08
32. Seal, air, fan, 1st stage	 <p>PN 4075235 -C</p> <p>PN 4075235 PWA 407 Silicone Rubber AMS 4928 Titanium Alloy</p>	Steam clean	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

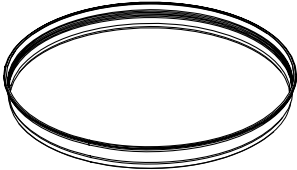
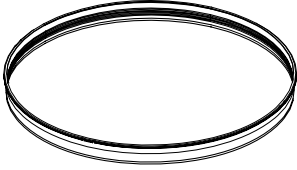
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
33. Seal, air, fan, 2nd stage	 <p>PN 4075236 -C</p> <p>PN 4075236 PWA 407 Silicone Rubber AMS 4928 Titanium Alloy</p>	Steam clean	
34. Seal, air, fan 3rd stage	 <p>PN 4075237 -C</p> <p>PN 4075237 PWA 407 Silicone Rubber AMS 4928 Titanium Alloy</p>	Steam clean	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

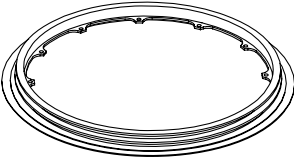
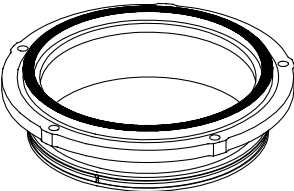
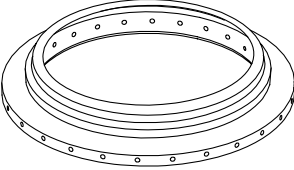
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
35. Seal, air, front compressor, inlet	 <p>PN4071080</p> <p>PN 4071080 PWA 1215 Titanium Alloy</p>		WP 031 03, WP 031 08
36. Seal Assembly, face, No. 1 bearing	 <p>PN 4054085 -C</p> <p>PN 4054085 AMS 5613 SST</p>	Oil soak. See paragraph 5.	
37. Seat, No. 1 bearing seal	 <p>PN4075499</p> <p>PN 4075499 AMS 5616 SST</p>		WP 031 09

Table 1. Inlet/Fan Module Parts Cleaning (continued)

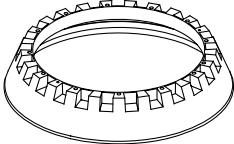
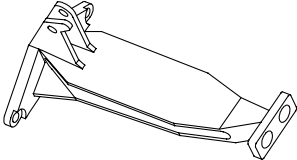
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
38. Shroud, front compressor, stator inlet	 <p>PN4059690</p> <p>PN 4059690 AMS 4928 Titanium Alloy</p>		WP 031 03, WP 031 08
39. Support Assembly, compressor inlet variable vane cylinder	 <p>PN4069491</p> <p>PN 4069491 PWA 1264 Titanium Alloy</p>	Steam clean	

Table 1. Inlet/Fan Module Parts Cleaning (continued)

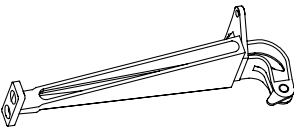
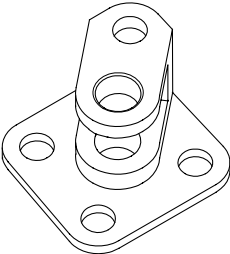
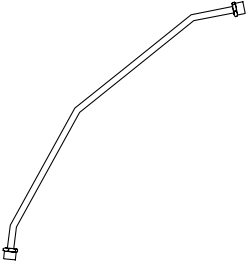
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
40. Support Assembly, variable vane compressor inlet	 PN4069476 PN 4069476 PWA 1264 Titanium Alloy	Steam clean	
40A. Support, Front Compressor Stator, Bell Crank, Inlet	 PN 4074199 -C PN 4074199 AMS 4928 Titanium Alloy	Steam clean	
41. Tube Assembly, Ps2, sense	 PN4071694-01 PN 4071694-01 AMS 5570 SST		WP 031 01 WP 031 09

Table 1. Inlet/Fan Module Parts Cleaning (continued)

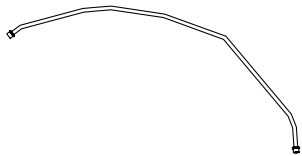
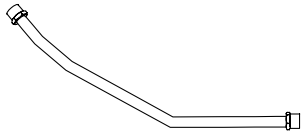
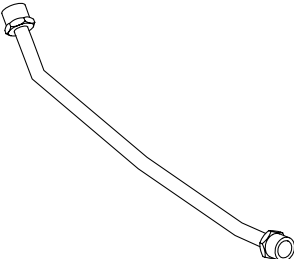
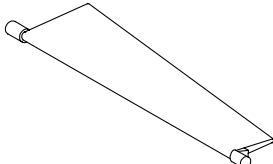
Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
42. Tube Assembly, Ps2, sense	 <p>PN4071695-01</p> <p>PN 4071695-01 AMS 5570 SST</p>		WP 031 01 WP 031 09
43. Tube Assembly, scavenge, No. 1 bearing	 <p>PN4071625-01</p> <p>PN 4071625-01 PWA 1260 Titanium Alloy</p>		WP 031 08

Table 1. Inlet/Fan Module Parts Cleaning (continued)

Part Name	Illustration Typical Part Number and Parent Material	Special Cleaning Instructions	Cleaning WP Reference T.O. 2J-F100-53-1
44. Tube Assembly, scavenge, No. 1 bearing	 <p>PN4071626-01</p> <p>PN 4071626-01 PWA 1260 Titanium Alloy</p>		WP 031 08
45. Vane, front compressor stator, variable, inlet	 <p>PN4071850 PN4074150</p> <p>PN 4071850 and PN 40741501 PWA 1228 Titanium Alloy</p>	PN 4074150 Steam clean	PN 4071850 WP 031 03, WP 031 08

4. PROTECTORS AND COVERS.

- a. If tool protector or cover was installed on a part during disassembly, it must be removed for cleaning of part. Reinstall tool protector or covers upon completion of cleaning.

5. NO. 1 BEARING SEAL FACE ASSEMBLY - CLEANING AND HANDLING.



Do not expose seal face assembly to foreign material such as grit, dirt or lint. Never wipe seal face assembly with cloth. Do not put seal face assembly in vapor degreaser and do not wash seal face assembly with degreasing fluid or any type of carbon solvent. These materials can remove impregnating agent in carbon element of seal face assembly and result in abnormal seal wear.

NOTE

Following procedures also apply to engine parts contacting carbon element of seal face assembly.

- a. Clean seal face assembly as follows:
 - (1) Prior to coke removal, soak seal face assembly for 30 minutes minimum in clean MIL-L-7808 oil at 120° to 140°F (48° to 60°C).

- (2) Remove deposits. If necessary, part may be carefully scraped with dull-edged tool to remove coke deposits.

- b. Handle seal face assembly as follows:

- (1) Individually box each seal face assembly with cardboard collar around carbon element of seal face assembly. Do not remove seal face assembly from box until it is to be used.
- (2) Once protective covering is removed, handle seal face assembly carefully to prevent damage to carbon face. Do not stack seal face assemblies.

6. FAN CASE ASSEMBLY - CLEANING.

- a. Clean case assembly by steam or wipe with P-D-680, Type II petroleum solvent.

7. NO. 1 BEARING RETAINING NUTS - STEAM CLEANING.



Use of alkali for cleaning self-locking retaining nuts will result in damage to self-locking nylon insert.

- a. After completion of steam cleaning, dry nuts thoroughly, oil entire nut with MIL-L-7808 engine oil, and place in protective container.

7A. FRONT COMPRESSOR DRUM ROTOR DISK ASSEMBLY - REMOVAL OF COPPER NICKEL DEPOSITS FROM BLADE SLOTS PRIOR TO INSPECTION.

(See Figure 1 and Table 2.)

WARNING

Entrapped contaminants such as fluorescent penetrant inspection fluids and oil will react violently with alkali cleaner if not removed prior to immersion of drum rotor and may result in injury to personnel.

- a. Clean drum rotor assembly using steam or hot soap and water. Pay particular attention to cleaning of bore area.
- b. Visually inspect all masks prior to use. Ensure that no dimensional deterioration, cracks, or tears exist. Replace masks as required.
- c. Install PWA 71035 masking plugs in holes (2, figure 1), and PWA 71037 masking plugs in holes (3). See figure 1.
- d. Install PWA 71038-1 mask in aft bore area(5). See figure 1.

WARNING

Alkali solution(PS110) is composed of 80% sodium hydroxide. Stripping solution (PS11) is composed of 50% nitric acid. Take appropriate safety precautions.



Failure to ensure that all masks are securely in place and all openings to drum bore area are sealed off to prevent solution from entering inside of bore or hardface coating will be degraded and drum rotor deemed unserviceable.



Use water specified to reduce contamination.

- e. Clean drum rotor per table 2, installing PWA 71038-3 and PWA 71038-2 masks in forward bore area(4) as required. Chloride/chloride content of water shall not exceed 25 parts per million(ppm).

- f. Remove masking materials.



Use water specified to reduce contamination.

- g. Pressure rinse entire part, including bore area, using steam or hot water. Chloride/chloride content of water shall not exceed 25 parts per million(ppm).
- h. Visually inspect hardface coating(1) per WP 322 00. Evidence of coating distress from stripping solution could be discoloration, etching, or inconsistencies in surface texture.

Table 2. Front Compressor Drum Rotor - Cleaning For Removal of Copper Nickel Deposits From Blade Slots

Operation Number	Description of Operation	Time (Minutes)	Solution	Temperature
1	Install PWA 71096 eye to forward bore area(4). Lift rotor and install PWA 71038-1 mask into rear bore of drum rotor. Place rotor(vertical position) in basket. Remove PWA 71096 eye and install PWA 71038-3 mask to forward bore area(4).			



Failure to prevent solution from entering hole in vented mask will result in damage to hardface area.

2	With rotor in VERTICAL position, immerse in aqueous cleaner. Do not completely submerge part. Front face of hub shall be 3 to 5 inches above surface of solution, so that solution does not enter hole in vented mask. (Rotor may be immersed for periods of 4 to 5 minutes, followed by a rinse, up to maximum allowable time as required to ensure complete removal of antigalling compound.)	25 to 35	PS-110 or equivalent	180° to 200°F (82° to 93°C)
3	Immerse rotor in water to rinse.	0.5 to 1.5	Water	Room
4	Install PWA 71038-2 mask in forward bore area(4). Thread PWA 71096 eye onto front hub of rotor, and install PWA 71292 adapter to rear bore. Using PWA 71294 sling, lift rotor horizontally into PWA 71293 holder. Remove PWA 71292 adapter and install PWA 71038-1 mask.			

WARNING

Rotor shall be immersed horizontally in nitric acid to prevent solution from being trapped on top of disks and splashing on personnel when rotor is removed from tank, preventing injury to personnel.

5	With rotor in HORIZONTAL position to permit proper drainage, immerse in stripping solution.	10 to 15	PS-11	Room
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Table 2. Front Compressor Drum Rotor - Cleaning For Removal of Copper Nickel Deposits From Blade Slots (continued)

Operation Number	Description of Operation	Time (Minutes)	Solution	Temperature
6	Immerse rotor in water to rinse	0.5 to 1.5	Water	Room
7	Visually inspect for complete removal of coating using white light and 10X magnifying glass. If required, residues may be dislodged by using a non-abrasive, non-metallic, stiff bristle brush followed by a water rinse. Repeat operations 4 through 7, if necessary, until deposits have been completely removed.			

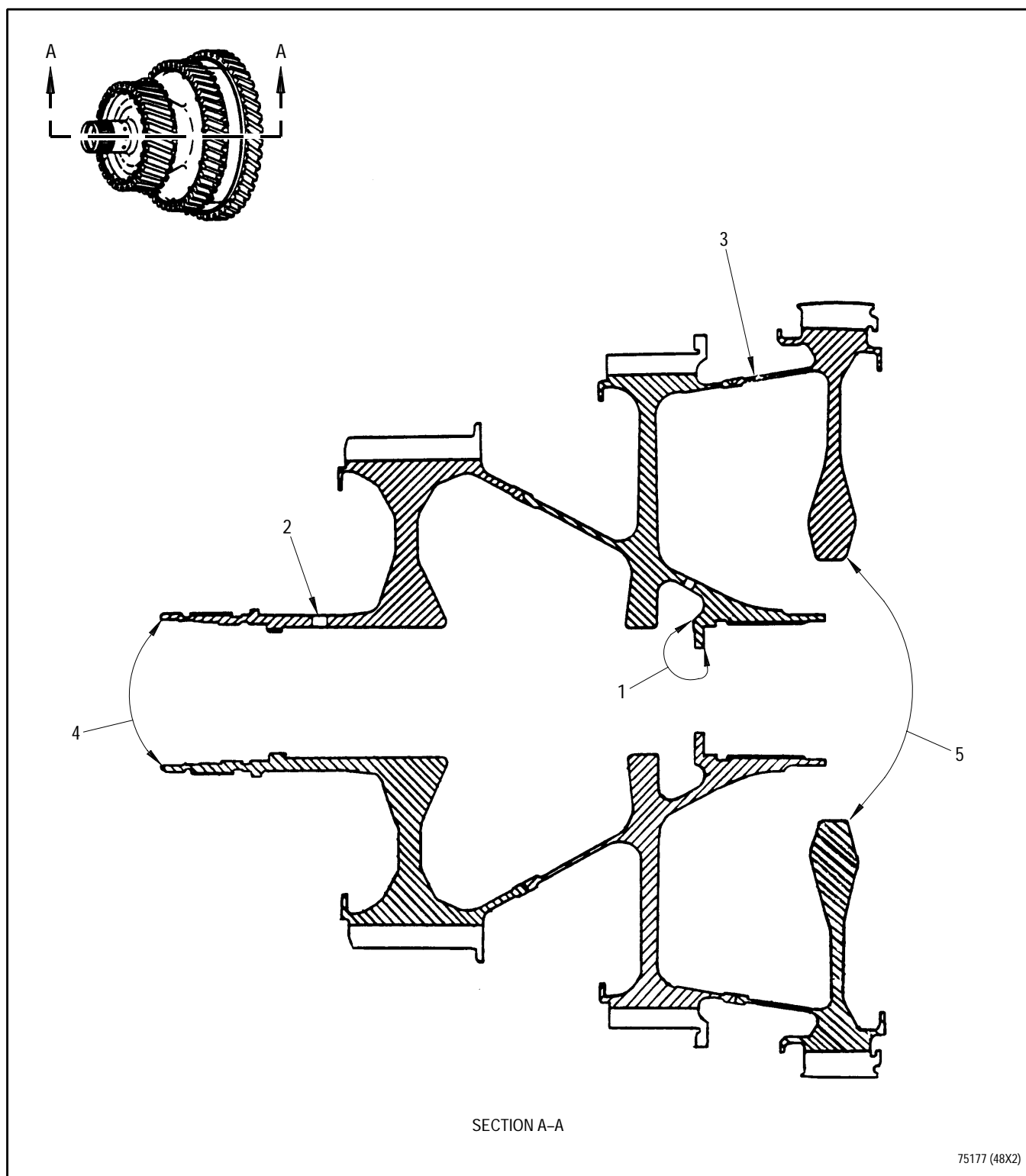


Figure 1. Front Compressor Drum Rotor Disk Assembly - Masking For Removal of Copper Nickel Deposits

Legend for figure 1

1. Hardface coating location, all around (reference).
2. 0.351 to 0.391 inch diameter holes, 10 places around circumference (reference).
3. 0.216 to 0.220 inch diameter holes, 2 places around circumference (reference).
4. Forward bore area.
5. Aft bore area.

8. FOLLOW-ON MAINTENANCE.

- a. After part has been cleaned,
inspect part per applicable work
package.

WORK PACKAGE

INTRODUCTION

INLET/FAN MODULE - INSPECTION

ENGINE

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	22	3	2	4 Blank	2

WP 300 00

1. INTRODUCTION.

This work package introduces the 300 00 through 399 00 series of work packages for the inlet/fan module parts - inspection. The following work packages are included in this series:

WP No.	Title
301 00	Inspection - General
302 00	Tube Assembly, Scavenge, No. 1 Bearing; and Tube Assembly, Ps2, Sense - Inspection
303 00	Inverted Nut, Spanner; and Nut, Bearing Retaining, Internally Threaded, No. 1 Bearing - Inspection
304 00	Bearing Assembly, Roller No. 1 - Inspection
305 00	Seat, No. 1 Bearing Seal - Inspection
306 00	Seal Assembly - Face, No. 1 Bearing - Inspection
307 00	Housing Assembly, No. 1 Bearing - Inspection
308 00	Ring Assembly - Synchronizing, Front Compressor Stator, Inlet; and Lever Arm Assembly, Compressor Stator Linkage - Inspection
309 00	Deleted
310 00	Case Assembly, Fan Inlet - Inspection
311 00	Shroud, Front Compressor Stator, Inlet - Inspection
312 00	Vane, Front Compressor Stator Variable; Inlet Bearing, Compressor Stator; Shroud Bearing, Compressor Stator; And Inlet Bolts, Self-Locking, Hex - Inspection
313 00	Seal, Air, Front Compressor, Inlet - Inspection
314 00	Seal, Air, Compressor, First Stage, Rear - Inspection
315 00	Blades, Compressor Rotor (First, Second, and Third Stages) - Inspection
316 00	Seal, Air, Fan (First, Second, and Third Stages) - Inspection
317 00	Lock, Compressor Stator (First and Second Stages) - Inspection
318 00	Compressor Stator Assembly (First and Second Stages) - Inspection

WP No.	Title
319 00	Seal, Air, Compressor, Front, First Stage - Inspection
320 00	Seal, Air, Compressor, Front, Second Stage - Inspection
321 00	Ring, Compressor Blade Lock, Third Stage - Inspection
322 00	Disk Assembly, Drum Rotor, Front Compressor - Inspection
323 00	Brackets, Lower Front, Upper Front, Engine Diagnostic Unit - Inspection
324 00	Case Assembly, Fan - Inspection
325 00	Support, Front Compressor Stator, Bell Crank, Inlet - Inspection
326 00	Connecting Link, Rigid, Front Compressor Stator and Connecting Link, Compressor Stator, Inlet - Inspection
327 00	Bell Crank Assembly, Front Compressor Stator Linkage, Inlet - Inspection
328 00	Clevis, Rod End - Inspection
329 00	Seal Ring, No. 1 Bearing Metal - Inspection
330 00	Open
331 00	Support Assembly, Variable Vane, Compressor Inlet - Inspection
332 00	Bearings, Balance - Inspection
333 00	Bracket Assembly, Connecting Link - Inspection
334 00	Open
through	
399 00	

WORK PACKAGE

TECHNICAL PROCEDURES

INSPECTION -

GENERAL

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 5	0				
6 Blank	0				

REFERENCE MATERIAL REQUIRED

Title		Number
Standard Maintenance Procedures	- - - - -	T.O. 2-1-111
Nondestructive Inspection	- - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Oil, corrosion preventive	MIL-C-15074
(PMC 9101)	AMS 3065

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains general information applicable to part inspection.

2. GENERAL.

- a. Instructions contained in inspection packages supplement judgment and experience of a qualified inspector. The correct interpretation of visual defects of wear, scuffing, pitting, etc. is the result of years of experience in the area of engine parts inspection. As a guide, experienced personnel should carefully follow inspection data and use good common sense.

3. CORROSION CONTROL.

- a. Protection from corrosion damage is required if parts are not installed or assembled soon after inspection. All unprotected surfaces of steel parts and parts known to have corrosion difficulties shall be lightly coated with corrosion preventive oil conforming to MIL-C-15074 (AMS 3065).

4. PROTECTORS AND COVERS.

- a. If tool protector or cover was installed on part during disassembly, it shall be removed for inspection and repair of part.
- b. Install tool protector or cover upon completion of inspection and repair.

5. MAGNETIC PARTICLE INSPECTION.

- a. Refer to T.O. 2J-F100-9, Nondestructive Inspection, for inspection methods and engine parts requiring this type inspection.

6. FLUORESCENT PENETRANT INSPECTION.

- a. Refer to T.O. 2J-F100-9, Non-destructive Inspection, for inspection methods and engine parts requiring this type inspection.

7. INSPECTION TABLES OR FIGURE LEGENDS.

- a. Inspection shall be visual unless otherwise specified.
- b. Inspection work packages are revised as additional information is obtained as a result of increased service time of engine parts.
- c. Inspection tables or figure legends shall be interpreted as follows:

- (1) Inspection Area - Condition column: Defines area of part to be inspected and type of damage or wear to be observed. Terms used are defined in T.O. 2-1-111.

- (2) Maximum Serviceable Limits column: Defines maximum variation from manufacturers new part standard with which part may be returned to service without repair.

- (3) Maximum Reparable Limits column: Defines maximum variation from manufacturers new part standard for which repair shall then be made. Parts exceeding this limit are not considered reparable.

- (4) Corrective Action column: Present repair or replacement action depending on serviceable or reparable limits or both.

d. Example:

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Cover - Cracks	One inch in length.	Two inches in length.	Weld repair per paragraph 4.
(1) Cover cracked one inch or less is serviceable and may be returned to service without repair. However, crack may be repaired if desired. Corrective Action column tells how crack shall be repaired.		(3) Cracks exceeding two inches are not repairable.	
(2) Cover cracked between one and two inches must be repaired before part is returned to service. Corrective Action column tells how crack shall be repaired.			

WORK PACKAGE

TECHNICAL PROCEDURES

TUBE ASSEMBLY, SCAVENGE, NO. 1 BEARING; AND TUBE ASSEMBLY, Ps2, SENSE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 5	0	6 Blank	0		

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

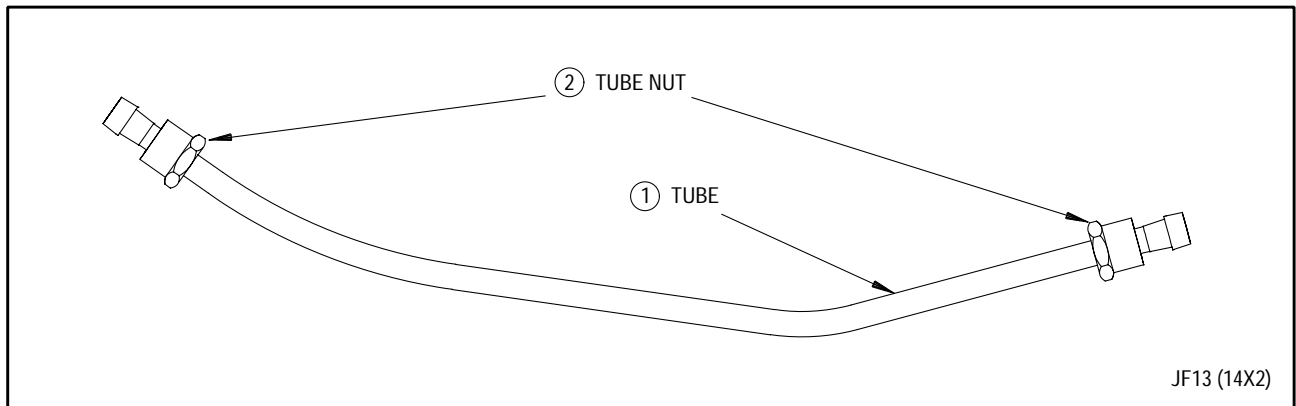
1. INTRODUCTION.

- a. This work package contains instructions for inspection of No. 1 bearing scavenge and Ps2 sensing tubes.

2. NO. 1 BEARING SCAVENGE AND Ps2 SENSING TUBE ASSEMBLIES - INSPECTION.

(See Figure 1.)

- a. Inspect the No. 1 bearing scavenge and Ps2 sensing tube assemblies. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Tube -			
Dents	0.062 inch deep. No portion of dent shall have sharp edges or corners with radius of less than 0.060 inch.	Depth of blend shall not exceed 0.006 inch.	Blend repair per WP 402 00 to meet limits. Replace tube assembly exceeding serviceable limits.
Flattened area	Flattened area due to bends or twisting shall not exceed 5% of tube OD.	Not reparable	Replace tube assembly.

Figure 1. No. 1 Bearing Scavenge and Ps2 Sensing Tube Assemblies - Inspection

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Tube - (continued)			
Nicks	0.004 inch deep	Depth of blend shall not exceed 0.006 inch	Blend repair per WP 402 00. Replace tube assembly exceeding reparable limit.
Scratches	0.002 inch deep	Depth of blend shall not exceed 0.006 inch.	Blend scratches deeper than 0.002 inch per WP 402 00 to remove sharp edges and corners with less than 0.060 inch radius. Replace tube assembly if scratch extends more than 180 degrees around tube.
Chafing	0.004 inch deep	Depth of blend shall not exceed 0.006 inch.	Blend chafing deeper than 0.004 inch per WP 402 00 to remove sharp edges and corners with less than 0.060 inch radius. Replace tube assembly if chafing extends more than 180 degrees around tube.
Cracks	Not serviceable	Not reparable	Replace tube assembly.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Tube - (continued)			
Pitting	Visible corrosion pits and minor isolated pitting are acceptable provided depth of pit is not more than 0.002 inch deep.	Depth of blend shall not exceed 0.006 inch	Pitting deeper than 0.002 inch shall be blended per WP 402 00. Replace tube assembly if maximum repairable limits are exceeded.
2. Tube nut -			
Thread damage	Not serviceable	Not repairable	Replace tube assembly.

WORK PACKAGE

TECHNICAL PROCEDURES

INVERTED NUT, SPANNER; AND NUT, BEARING RETAINING,
INTERNALLY THREADED, NO. 1 BEARING -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
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2	-	3	.	.	0
4	1

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

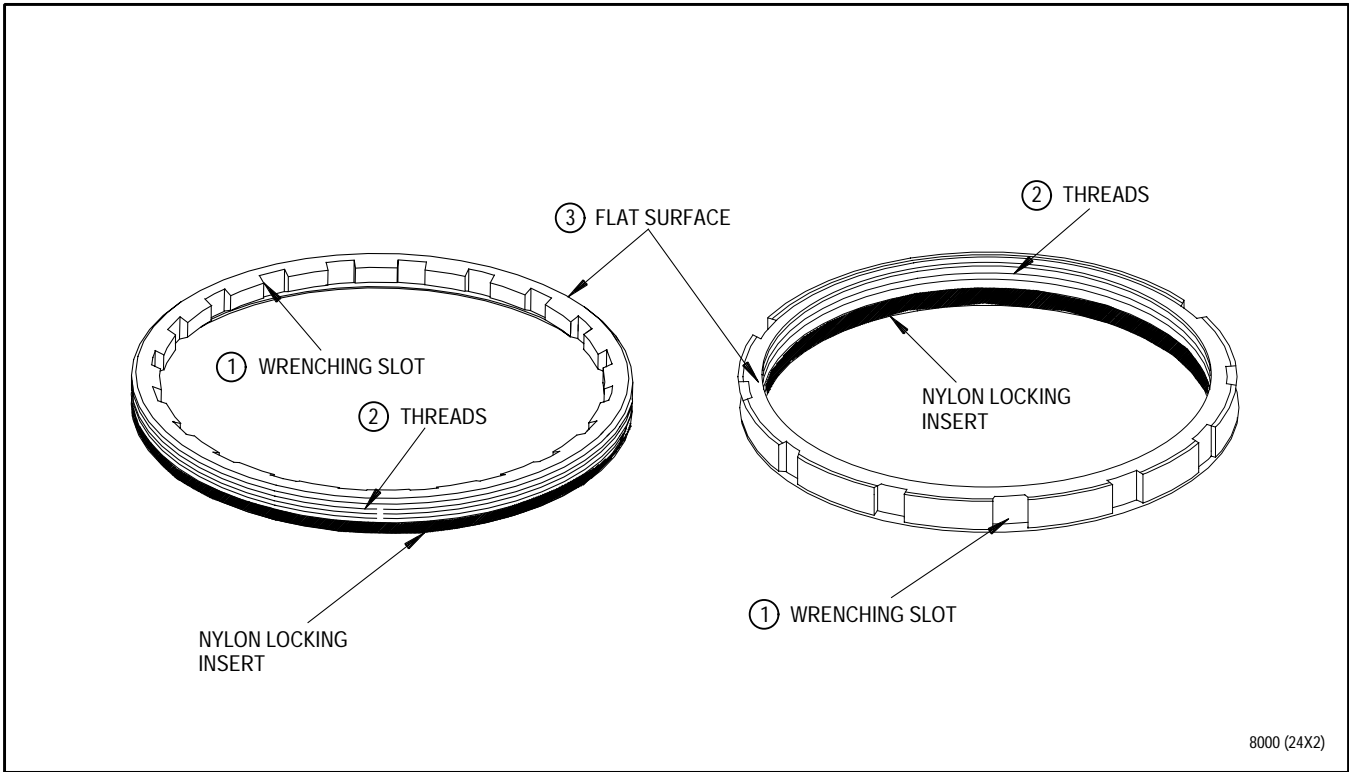
- a. This work package contains instructions for inspection of No. 1 bearing inner and outer retaining nuts.

2. NO. 1 BEARING INTERNALLY THREADED AND INVERTED SPANNER NUT - INSPECTION.

(See Figure 1.)

- a. Inspect nut for cracks using magnetic particle inspection method. Refer to T.O. 2J-F100-9. No cracks allowed.

- b. Visually inspect nut using white light and 3X magnifying glass for surface damage and wear per figure 1.
- c. Nut nylon locking insert(4) has a seam. During visual or MPI method, indication of seam is not cause for rejection of nut.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Wrenching slots -			
Tool marks, burrs	Not serviceable	See corrective action.	Blend repair per WP 403 00.
2. Threads -			
Wear	Not serviceable	Not reparable	Replace nut.
3. Flat surfaces -			
Burrs, galling, scoring tool damage	Not serviceable	See corrective action.	Blend repair per WP 403 00.

Figure 1. No. 1 Bearing Internally Threaded and Inverted Spanner Nut - Inspection

WORK PACKAGE**TECHNICAL PROCEDURES****BEARING ASSEMBLY, ROLLER NO. 1 -****INSPECTION****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	28	3	28	5 Added	28
2	16	4	0	6 Blank Added	28

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Production and General Information - - - - -	T.O. 2J-F100-53-1
General Procedures - Marking, General - - - - -	WP 023 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
OIL, LUBRICATING	MIL-L-7808
PAPER, GREASEPROOF BARRIER MATERIAL	MIL-B-121

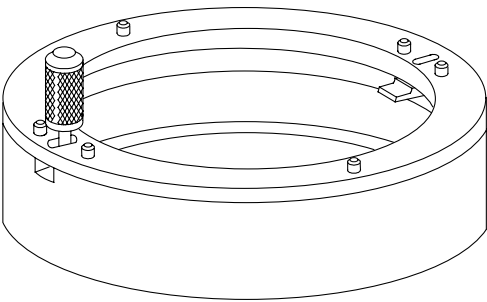
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2	NO. 1 ROLLER BEARING ASSEMBLY - INSPECTION	
	RETAINER, NO.1 BEARING INNER RACE AND ROLLERS - - -	PWA 51791

ILLUSTRATED SUPPORT EQUIPMENT



PWA 51791 -C

Figure T1. PWA 51791 RETAINER

1. INTRODUCTION.

- a. This work package contains instructions for inspection of No. 1 roller bearing assembly.

2. NO. 1 ROLLER BEARING ASSEMBLY - INSPECTION.

(See Figure 1 and Tables 1 and 2.)



Marking functional or nonfunctional surfaces of bearings may cause stack-up deviations and/or bearing damage.

- a. Inspect bearing per table 1 and T.O. 2-1-111. If separating outer race from inner race and rollers, use PWA 51791 retainer to secure rollers to inner race.

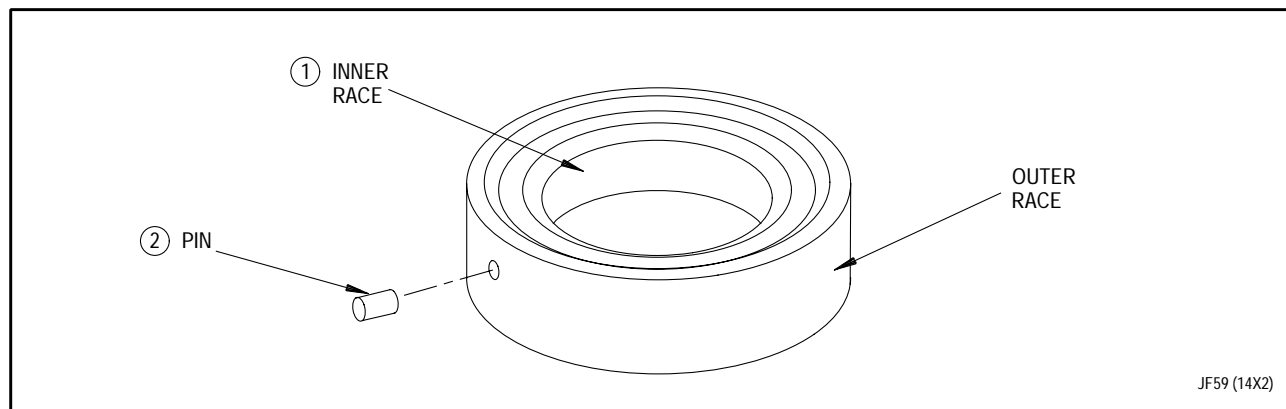
- b. Inspect four oil holes in inner race to ensure they are open. Remove any obstruction that may be present.
- c. Inspect bearing per table 2 for unserviceable damage modes (work unit codes and numbers). Refer to T.O. 2-1-111. Unserviceable bearings are to be repaired per WP 404 00.
- d. Inspect outer race OD for loose, damaged, or missing pins per WP 404 00 for replacement of pins.
- e. Preserve bearing. Refer to T.O. 2J-F100-53-1, WP 022 00.

Table 1. No. 1 Bearing Limits

Part No.	Bore	Internal Radial Clearance
4018466	3.9372	0.0035
	3.9367	0.0025 (33)
4018467	3.9372	0.0035
	3.9367	0.0025 (33)
4060870	3.9372	0.0035
	3.9367	0.0025 (33)
4061549	3.9372	0.0035
	3.9367	0.0025 (33)
4082584	3.9372	0.0035
	3.9367	0.0025 (33)

NOTE

Number in parenthesis is load in pounds.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Inner race -			
Obstructed oil holes	Not serviceable	Any amount is repairable provided corrective action can be performed.	Remove obstruction.
2. Pins (in outer race) -			
Loose, damaged, or missing	Not serviceable	See corrective action.	Replace pin per WP 404 00.

Figure 1. No. 1 Bearing Assembly - Inspection

Table 2. No. 1 Mainshaft Bearing

LCN CODE	TASK CODE	LOCATION	DISTRESS
EEA5CY	JGDFGAQ	Cage	Plate flake/peel
EEA5CY	JGDFGAR	Cage	Plate wear
EEA5CY	JGDFGAS	Cage	Out of round
EEA5CY	JGDFGAT	Cage	Crack
EEA5CY	JGDFGAC	Outer ring	Cracks
EEA5CY	JGDFGAD	Outer ring	Pit
EEA5CY	JGDFGAE	Outer ring	Dent/nick
EEA5CY	JGDFGAF	Outer ring	Scratches, scruffs, and scoring
EEA5CY	JGDFGAG	Outer ring	Skidding
EEA5CY	JGDFGAH	Outer ring	Spalling
EEA5CY	JGDFGAK	Roller	Pits
EEA5CY	JGDFGAL	Roller	Nick/dent
EEA5CY	JGDFGAM	Roller	Scratches, scruffs, and scoring
EEA5CY	JGDFGAN	Roller	Skidding
EEA5CY	JGDFGAP	Roller	Spalling
EEA5CY	JGDFGAJ	Outer race	Scoring

WORK PACKAGE

TECHNICAL PROCEDURES

SEAT, NO. 1 BEARING SEAL -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	15	4 - 6	0		

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
Lapping of Main Bearing Carbon Seals, Seal Plates, and Spacers - - - - -	SWP 091 05
Optical Flatness Check of Main Bearing Carbon Seals, Seal Plates, and Spacers - - - - -	SWP 091 06

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of No. 1 bearing seal seat.

2. NO. 1 BEARING SEAL SEAT - INSPECTION.

(See Figure 1.)

- a. Ensure that No. 1 bearing seal seat has been cleaned per WP 201 00.

- a1. Inspect No. 1 bearing seal seat.
See figure 1.

- a2. Magnetic particle inspect No. 1 bearing seal seat. Refer to T.O. 2J-F100-9. No cracks allowed.
- b. Lap seal seat and perform a flatness inspection if it will be used with a different carbon seal. Refer to T.O. 2J-F100-53-1, SWP 091 05 and T.O. 2J-F100-53-1, SWP 091 06.

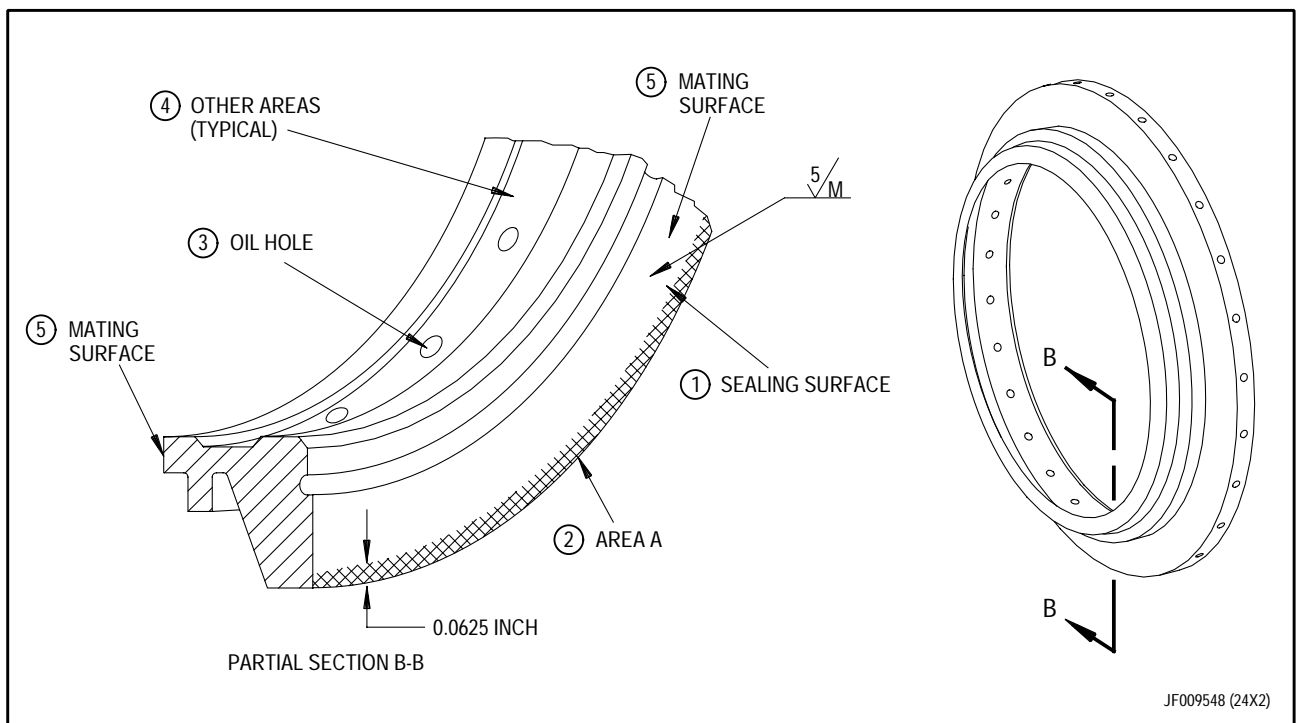


Figure 1. No. 1 Bearing Seal Seat - Inspection

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Sealing surface			
-			
Pitted	a. 0.010 inch across longest dimension b. Pits must be at least one inch apart c. Maximum of three pits allowed	Not reparable	Replace seat.
Scored	Not serviceable	Not reparable	Replace seat.
Cracks	Serviceable if cracks do not extend into base material.	Not reparable	Replace seat.
Nicks, dents without protruding material	Serviceable provided no protruding material exists	See corrective action.	Polish or lap raised material per WP 405 00. Replace seat exceeding repair limits in WP 405 00.
Scratches across sealing surface	a. 0.001 inch deep and 0.001 inch wide	See corrective action.	Polish or lap per WP 405 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Sealing surface - (continued)			
Chipping	a. 0.010 inch length b. 0.010 inch radial width c. Chipping must not be closer together than 0.125 inch d. Combined length of all chipping shall not exceed 0.400 inch.	Not reparable	Replace seat.
NOTE			
Do not confuse discoloration or carbon deposits (smear) with unevenness.			
Uneven flatness and finish.	Sealing surface must show uniform contact all around. Blotchy carbon deposits are permissible, provided appearance is uniform and deposits cannot be felt with 0.030 inch scribe.	See corrective action.	Lap per WP 405 00.
Wear grooves	Acceptable provided grooves cannot be felt with 0.030 inch scribe.	See corrective action.	Lap per WP 405 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
2. Area A - Chipping	Serviceable provided chipping is outside seal contact area and does not exceed 0.0625 inch in depth.	Not repairable	Replace seat.
3. Oil holes - Blocked	Not serviceable	Any amount is repairable provided corrective action can be performed.	Remove obstruction.
4. Other areas - Nicks, dents, burrs	0.030 inch deep	Any amount	Deburr/remove high material only.
5. Mating surface - Scoring	Not serviceable	Not repairable	Replace seat.

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL ASSEMBLY, FACE, NO. 1 BEARING -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 5	0	6 Blank	0		

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

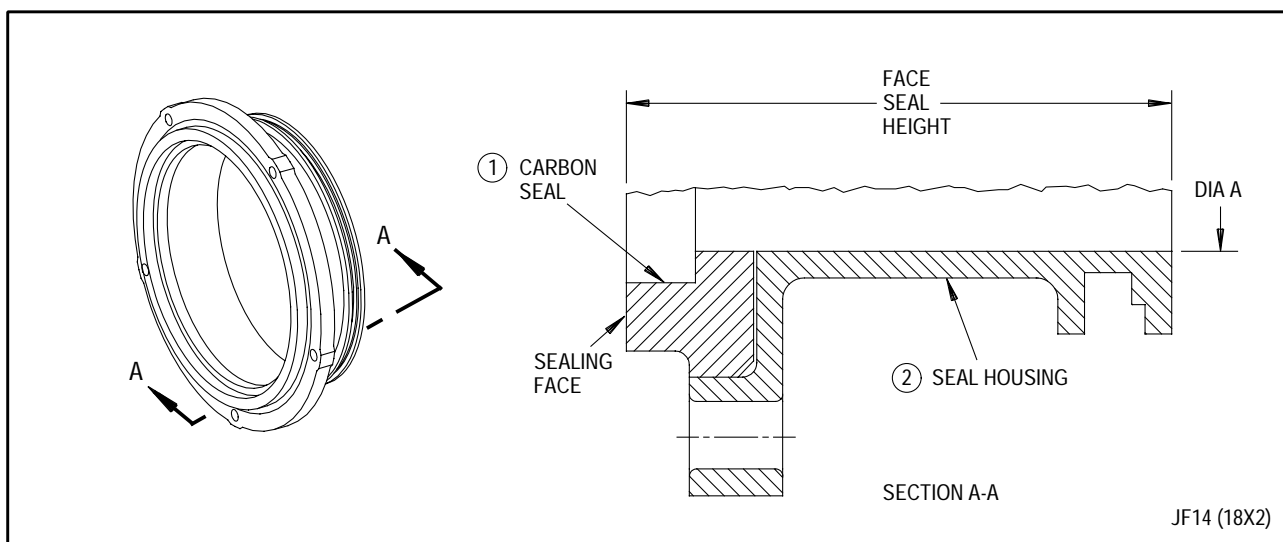
1. INTRODUCTION.

- a. This work package contains instructions for inspection of No. 1 bearing face seal assembly.

2. NO. 1 BEARING FACE SEAL ASSEMBLY - INSPECTION.

(See Figure 1.)

- a. Inspect bearing seal face assembly. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable limits	Corrective Action
1. Carbon seal -			
Wear (face seal height)	1.590 inches minimum	Not reparable	Replace seal assembly.
Cracks	Not serviceable	Not reparable	Replace seal assembly.
Deterioration (crumbling of carbon)	Not serviceable	Not reparable	Replace seal assembly.

Figure 1. No. 1 Bearing Face Seal Assembly - Inspection

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable limits	Corrective Action
1. Carbon seal - (continued)			
Chipping, nicks, scratches (sealing face)	Serviceable provided concentric circular area of not less than 60% of original width of seal face remains undamaged and makes sealing contact with seal plate.	Defects larger than serviceable limit may be partially removed by lapping to serviceable limit while maintaining face seal height within service limit.	Replace seal assembly or repair by lapping per WP 406 00.
Chipping, nicks, scratches (in nonsealing faces)	Serviceable provided all other items of this table are observed.	None	None
Scratches extending radially across sealing face	Serviceable provided depth does not exceed 0.005 inch and width does not exceed 0.010 inch.	Scratches larger than serviceable limit may be partially removed by lapping to serviceable limit while maintaining face seal height within serviceable limit.	Replace seal assembly or repair by lapping per WP 406 00.
Squareness	Sealing face must be square with ID of seal housing Diameter A within 0.001 inch.	Squareness may be partially regained by lapping to serviceable limit while maintaining face seal height of 1.590 inches minimum.	Repair by lapping or replace carbon element if beyond reparable limits per WP 406 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable limits	Corrective Action
1. Carbon seal - (continued)			
Flatness (sealing face)	Flatness of sealing face shall be within two helium light bands. Inspect using optical flats. Refer to T.O. 2-1-111.	Flatness may be partially regained by lapping to serviceable limit while maintaining face seal height of 1.590 inches minimum.	Replace seal assembly or repair by lapping per WP 406 00.
Surface finish	Serviceable if light bands are visible during flatness check.	Surface finish may be restored by lapping while maintaining face seal height of 1.590 inches minimum.	Replace seal assembly or repair by lapping per WP 406 00.
2. No. 1 bearing seal housing -			
Cracks	Not serviceable	Not repairable	Replace seal assembly.
Nicks, dents or scratches (without burrs)	Serviceable	None	None
Nicks,dents or scratches (with burrs)	Not serviceable	Any amount	Remove high metal with fine file or stone.
Rivets loose, damaged or missing	Not serviceable	Not repairable	Replace seal assembly.

WORK PACKAGE

TECHNICAL PROCEDURES

HOUSING ASSEMBLY, NO. 1 BEARING -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	17	2A Added	15	3	17
2	0	2B Blank Added	15	4	0

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Cloth, abrasive, crocus	P-C-458

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

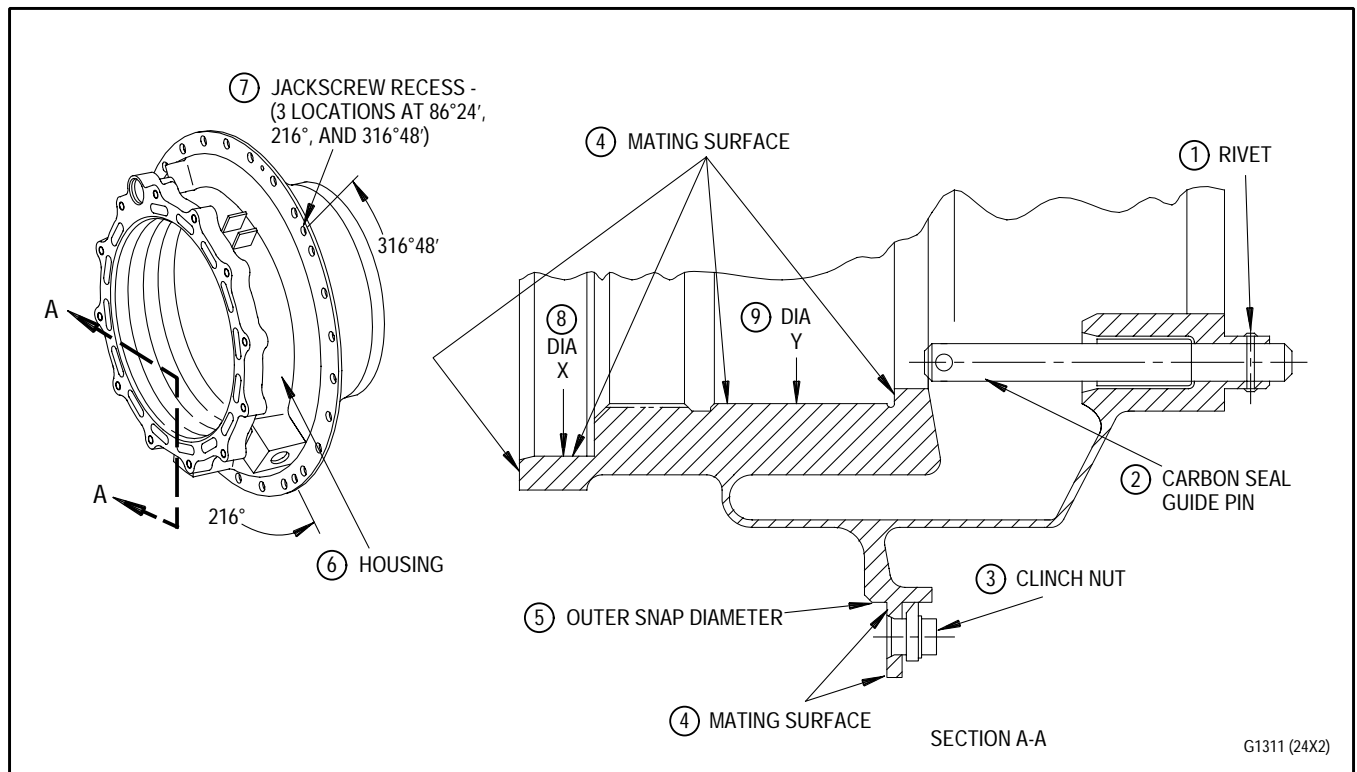
- a. This work package contains instructions for inspections of No. 1 bearing housing assembly.

2. NO. 1 BEARING HOUSING ASSEMBLY - INSPECTION.

(See Figure 1.)

- a. Ensure that No. 1 bearing housing assembly has been cleaned per WP 201 00.

- b. Fluorescent penetrant inspect No. 1 bearing housing assembly. Refer to T.O. 2J-F100-9. No cracks allowed.
- c. Inspect bearing housing assembly. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Rivet -			
Loose or missing	Not serviceable	Not repairable	Replace rivet. Refer to T.O. 2-1-111.
2. Carbon seal guide pins -			
Loose, bent, cracked, or missing	Not serviceable	Not repairable	Replace pin per WP 407 00.
Wear, scratches and nicks	Not serviceable	0.186 inch minimum diameter	Blend repair per WP 407 00.

Figure 1. No. 1 Bearing Housing Assembly - Inspection

Legend for figure 1 (continued)

Inspection Areas - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Clinch nuts - Loose, missing, stripped threads, loss of bolt locking friction, or rounded off antirotational flats	Not serviceable	See corrective action	Replace self-locking clinch nut per WP 407 00.
Locking (run-on) torque	2 to 13 pound-inches	See corrective action	Replace self-locking clinch nut per WP 407 00.
4. Mating surfaces -			
Pickup, high metal	Not serviceable	See corrective action	Blend repair. Remove high metal only.
5. Outer snap diameter (fan inlet case mating snap diameter) -			
Wear, surface defects	8.782 inches diameter minimum	See corrective action	Plasma repair per WP 407 00.
6. Housing - Cracks	Not serviceable	Not repairable	Replace housing assembly.
7. Jackscrew recess - Cracked or broken thru	Not serviceable	See corrective action	Weld repair per WP 407 00.
8. Diameter X -			
Wear	-	See corrective action	Plasma spray per WP 407 00.
9. Diameter Y -			
Wear	-	See corrective action	Plasma spray per WP 407 00.

WORK PACKAGE

TECHNICAL PROCEDURES

**RING ASSEMBLY - SYNCHRONIZING, FRONT COMPRESSOR STATOR, INLET; AND
LEVER ARM ASSEMBLY, COMPRESSOR STATOR LINKAGE -**

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	29	3 - 4	29	5	27
2	0			6	29

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of inlet front compressor stator synchronizing ring assembly and compressor stator linkage lever arm assembly.

2. INLET FRONT COMPRESSOR STATOR SYNCHRONIZING RING ASSEMBLY - INSPECTION.

(See Figure 1.)

- a. Inspect ring assembly for cracks using fluorescent penetrant method. Refer to T.O. 2J-F100-9. No cracks allowed.
- b. Visually inspect ring assembly using white light and 3X magnifying glass for surface damage and wear.
- c. Inspect synchronizing ring and lever arms per figure 1.

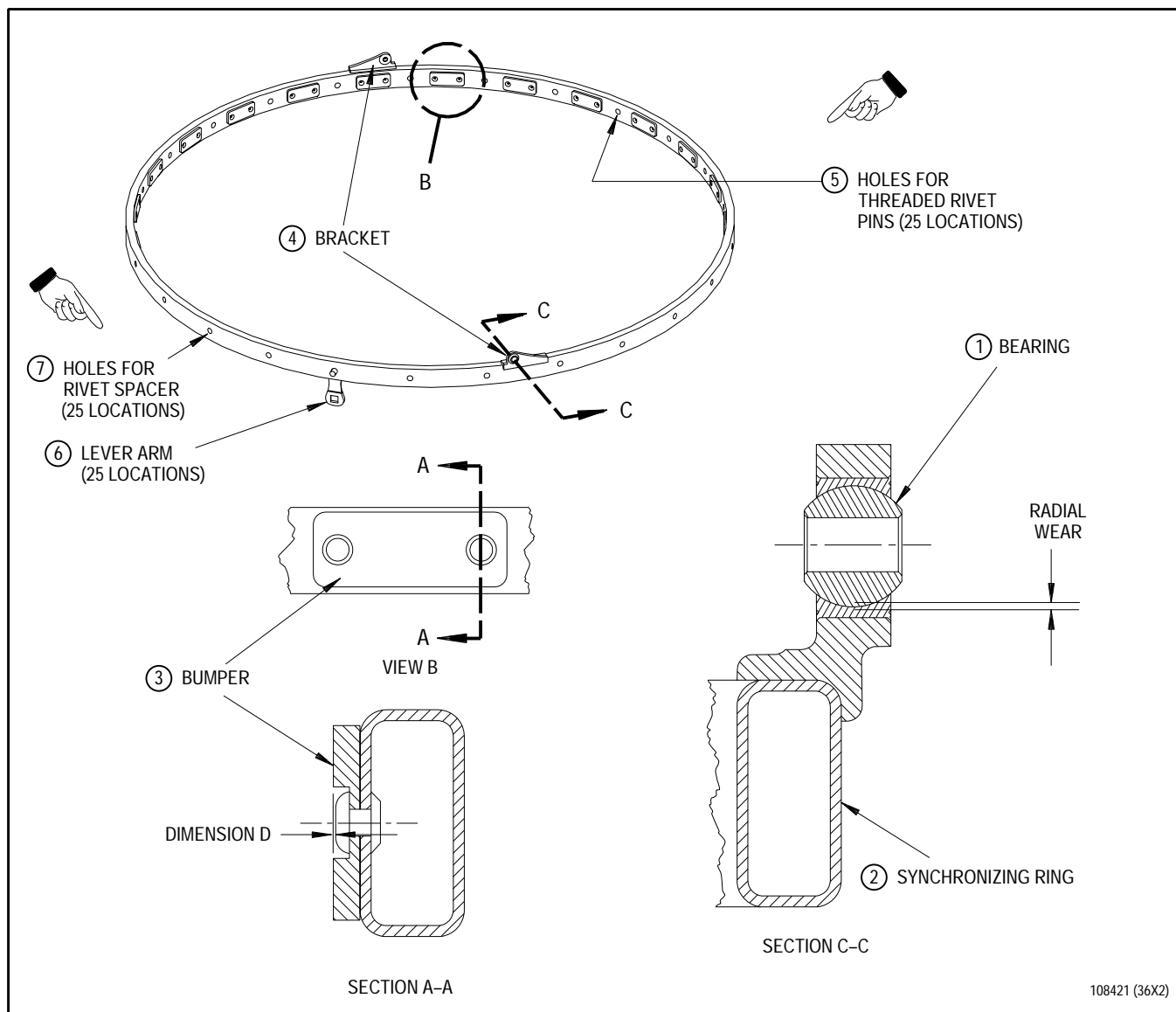


Figure 1. Inlet Front Compressor Stator Synchronizing Ring Assembly - Inspection

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Bearing -			
Lack of free movement	Ball shall move smoothly through 10° minimum cone angle. (Use fingers to inspect bearing.)	Not repairable	Replace bearing. Refer to T.O. 2J-F100-53-5, WP 544 00.
Loose	Bearing shall be held snug by staking groove on both sides of bracket	Not repairable	Replace bearing. Refer to T.O. 2J-F100-53-5, WP 544 00.
Radial wear	0.012 inch	Not repairable	Replace bearing. Refer to T.O. 2J-F100-53-5, WP 544 00.
2. Synchronizing ring -			
Cracks	Not serviceable	Not repairable	Replace synchronizing ring assembly.
3. Bumpers -			
Cracks	Not serviceable	Not repairable	Replace bumper per WP 408 00.
Looseness	Not serviceable	Not repairable	Replace bumper per WP 408 00.
Dimension D	0.008 inch minimum	Not repairable	Replace bumper per WP 408 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
4. Bracket -			
Cracks	Not serviceable	Not repairable	Replace synchronizing ring assembly.
5. Holes for threaded rivet pins (25 locations, ID of Ring) -			
Wear	0.194 inch maximum diameter	0.300 inch diameter	Weld repair per WP 408 00
6. Lever arms -			
Cracks	Not Serviceable	Not repairable	Replace lever arm per WP 408 00
Bent or twisted	Not Serviceable	Not repairable	Replace lever arm per WP 408 00
7. Holes for rivet spacer (25 locations, OD of ring) -			
Wear	0.313 inch maximum diameter	0.550 inch diameter	Weld repair per WP 408 00

WP 309 00 Deleted and data moved to WP 308 00

WORK PACKAGE

TECHNICAL PROCEDURES

CASE ASSEMBLY, FAN INLET -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	27	4A Added	27	5 - 6	19
2 - 3	16	4B Blank Added	27	7 Added	27
4	27			8 Blank Added	27

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Inlet/Fan Module - - - - -	T.O. 2J-F100-53-6
Case Assembly, Fan Inlet - Repair - - - - -	WP 410 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
PAD, ABRASIVE	SCOTCH-BRITE, 3M COMPANY

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of fan inlet case assembly.

2. FAN INLET CASE ASSEMBLY - INSPECTION.

(See Figure 1.)

- a. Ensure that fan inlet case assembly has been cleaned per WP 201 00.
 - a1. Install suitable protector handtight on ID connector and install suitable protector or equivalent on OD connector of quad N1 sensing electrical cable.
 - a2. Install suitable protectors on No. 1 bearing pressure and scavenge tubes to prevent penetrant contamination of oil system.
- b. Secure inner Ps2 and N1 connectors and braided cable pigtail to inlet case.



Vane containing quad N1 flexible cable or Ps2 heater cable may be sprayed or brushed, but not immersed, with fluorescent penetrant. Immersion may cause corrosion. Fluorescent penetrant shall be kept away from braided pigtail cable to prevent corrosion.

- c. Fluorescent penetrant inspect fan inlet case assembly for cracks on a system currently qualified per MIL-STD-1823 at 90 percent probability of detection and 50 percent confidence level to surface length indication of 0.070 inch long. Refer to T.O. 2J-F100-9. No cracks allowed.
- cl. Wipe inlet case strut*Visually inspect inlet case strut leading and trailing edges for cracks, using bright light and mirror. Leading edge inspection shall extend 3/8 inch back, and trailing edge inspection shall extend 1/2 inch forward. No cracks allowed.
- d. Visually inspect case, using white light and 3X magnifying glass for surface damage and wear. See figure 1.

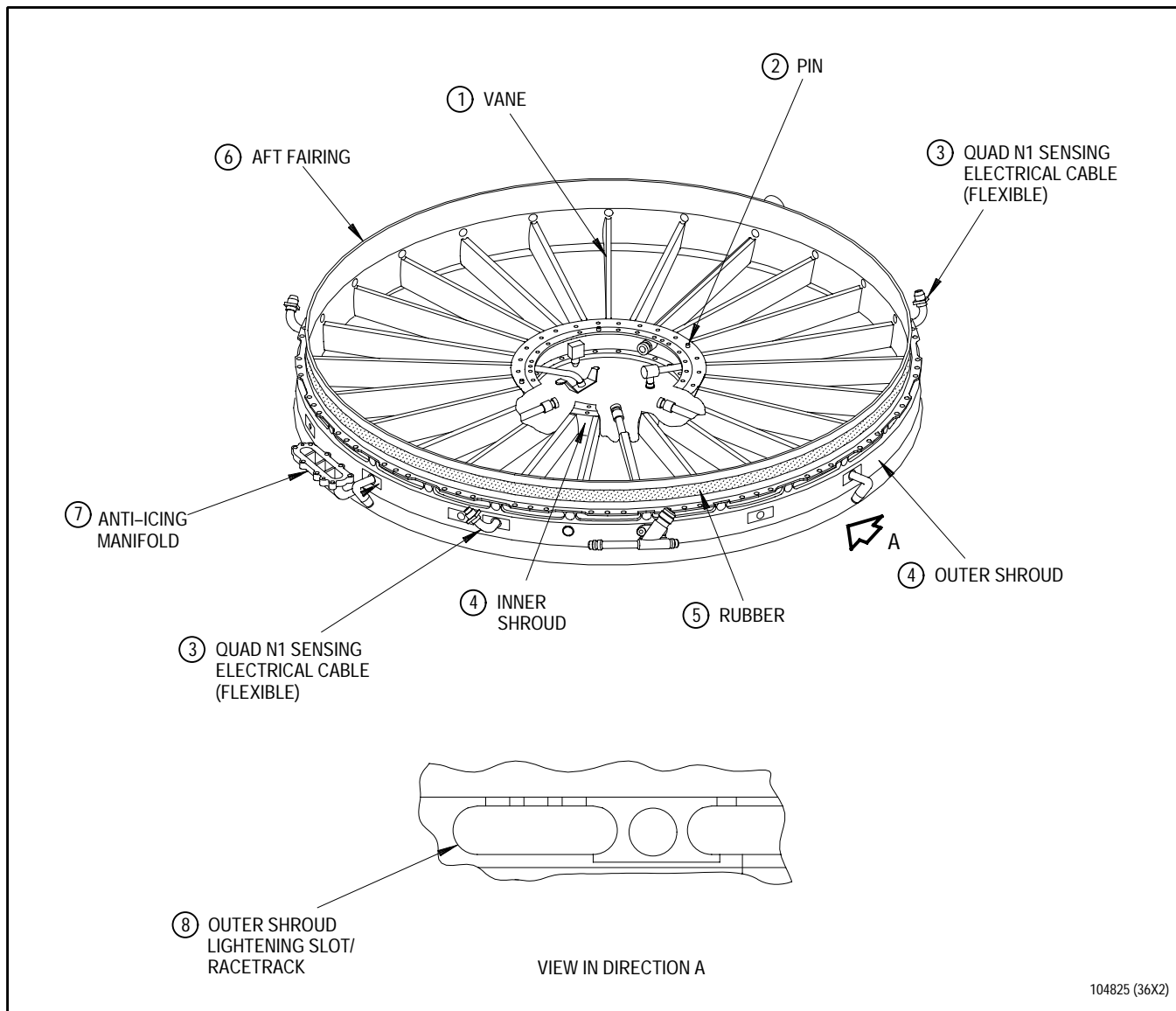


Figure 1. Fan Inlet Case Assembly - Inspection (Sheet 1 of 2)

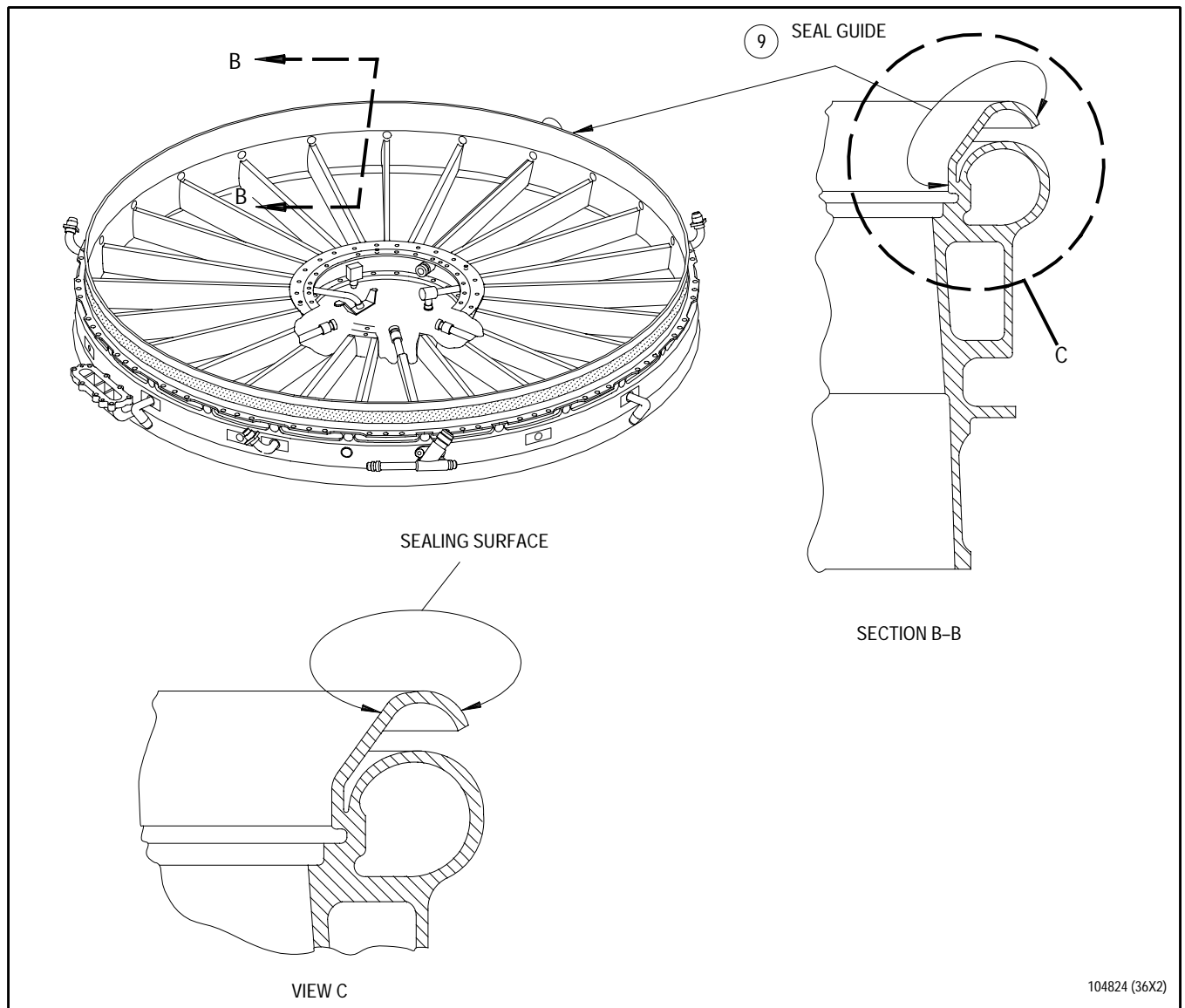


Figure 1. Fan Inlet Case Assembly - Inspection (Sheet 2 of 2)

Legend for figure 1

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Vanes-			
Isolated nicks and scratches on leading edge.	Not serviceable	0.010 inch deep after blending	Blend repair per WP 410 00.
Surface scratches and nicks	0.010 inch deep	0.010 inch deep after blending	Blend repair per WP 410 00.
Smooth or round bottom dents (without cracks or tears)	0.020 inch deep, 0.150 inch diameter maximum	0.020 inch deep after blending	Blend repair per WP 410 00.
2. Pins -			
Broken, loose, or missing	Not serviceable	Not repairable	Replace pin per WP 410 00.
3. Quad N ₁ sensing electrical cable flexible -			
Insulation resistance check	One megohm minimum	Not repairable	Replace case.
Electrical continuity check	Continuity	Not repairable	Replace case.
Damaged outer connector (surface)	Any amount of minor surface damage provided function or integrity not affected.	Damage that does not penetrate through or interfere with proper functioning of connector.	Blend repair surface per WP 410 00.
Bent pin	Not serviceable	Slightly bent 1/4 or less of total pin length out of position	Straighten pin per WP 410 00.

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Inner and Outer Shroud -			
Nicks and scratches	0.015 inch deep	Sharp indentations up to 0.015 inch deep	Blend repair per WP 410 00.
5. Rubber -			
Voids	10 square inches over total rubber area, or 0.50 square inches over any 3 inch circumference	See corrective action.	Replace rubber per WP 410 00.
6. Aft Fairing -			
Cracks, dents, chips, or missing pieces	Not serviceable	Not reparable	Replace case.
Fretting or galling of rear edge	Any amount	-	-
7. Anti-icing manifold threaded holes -			
Stripped or damaged threads	Damage is limited to one threaded hole per case. Damaged hole must have at least 7 undamaged threads	Not reparable	Replace case.
8. Outer shroud lightening slot/racetrack-			
Nicks and scratches	0.045 inch deep	Sharp indentations 0.045 inch deep	Blend repair per WP 410 00.

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
9. Seal Guide -			
Scratches, dents, nicks, and gouges	Any amount provided depth does not exceed 0.010 inch	To 0.020 inch depth. Spacing between adjacent blends to be five times the length of the longest blend	Blend repair per WP 410 00.
Cracks	None allowed	Any amount	Replace guide per WP 410 00.
Distortions on sealing surface	0.150 inch depth with a length to depth ratio of 30 or greater	Any amount	Replace guide per WP 410 00.

WORK PACKAGE

TECHNICAL PROCEDURES

SHROUD, FRONT COMPRESSOR STATOR, INLET -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	16	2 - 3	0	4 - 6	16

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

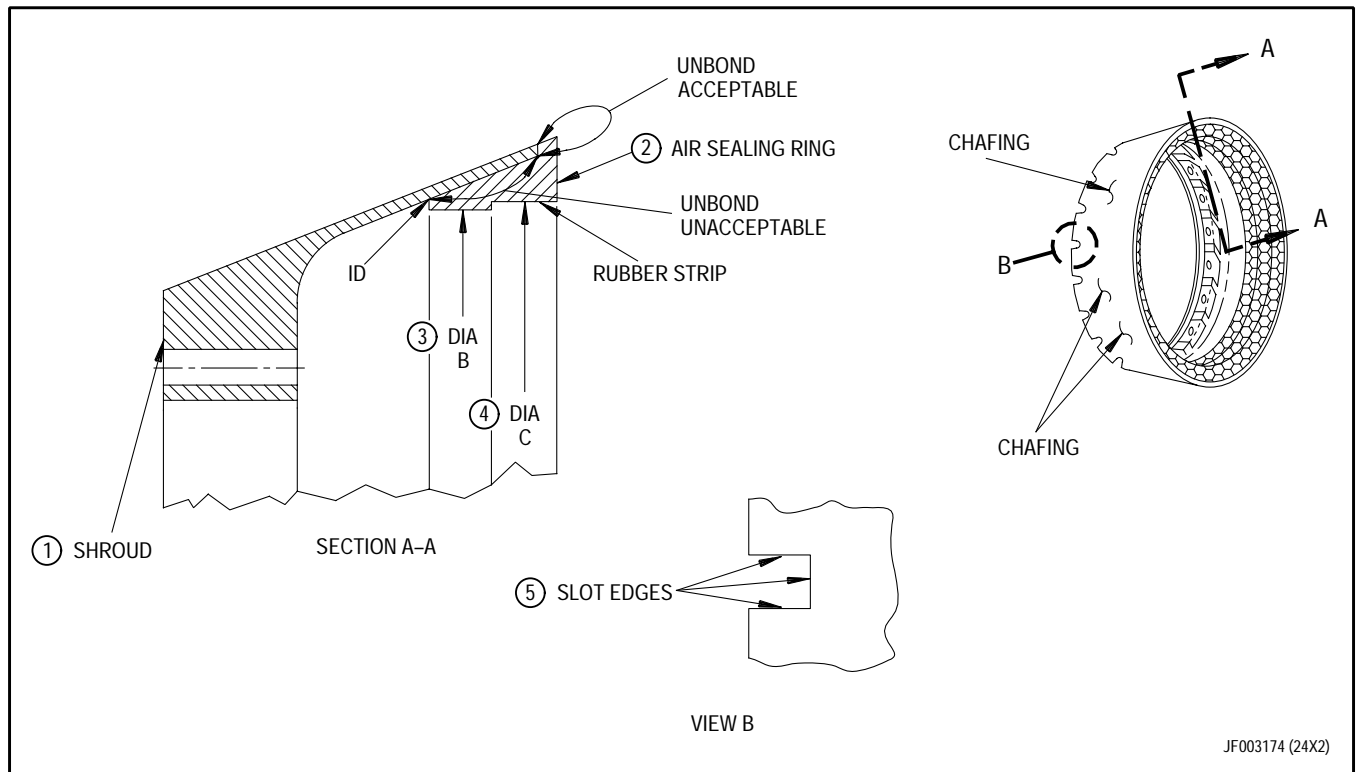
1. INTRODUCTION.

- a. This work package contains instructions for inspection of inlet front compressor stator shroud.

2. FRONT COMPRESSOR STATOR INLET SHROUD - INSPECTION.

(See Figure 1.)

- a. Inspect shroud for cracks using fluorescent penetrant method. Refer to T.O. 2J-F100-9. No cracks allowed.
- b. Visually inspect shroud using white light and 3X magnifying glass for surface damage and wear. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Shroud -			
Round-bottom dents	Less than 0.030 inch deep and 0.750 inch diameter maximum. Rounded no sharp edges	Not reparable	Replace shroud.

Figure 1. Inlet Front Compressor Stator Shroud - Inspection

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Shroud - (continued)			
Nicks and scratches	Not serviceable	Sharp indentations up to 0.015 inch deep.	Blend repair per WP 411 00.
Multi-directional nicks, tears, cuts, holes or cracks penetrating through walls	Not serviceable	Not repairable	Replace shroud.
Chafing or wear on OD of shroud	0.010 inch deep with no high metal.	Chafing up to 0.015 inch deep.	Blend repair per WP 411 00.
2. Air sealing ring -			
Rubber strip grooving	0.265 inch width maximum and 0.045 inch depth maximum over entire circumference.	Any amount	Replace rubber strip per WP 411 00.

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. Air sealing ring - (continued)			
Rubber strip damage	Shallow damage 0.045 inch maximum depth that does not extend across seal. Any one area may not exceed 0.500 square inch. Not more than three areas of damage separated by 4.000 inches of securely bonded rubber.	Any amount	Replace rubber strip per WP 411 00.
Rubber strip unbonding	All trailing edge rubber is in place and unbond does not extend into inner diameter at trailing edge.	Any amount	Replace rubber strip per WP 411 00.
	Unbonding of rubber strip extending into shroud inner diameter is not serviceable.	Any amount	Replace rubber strip per WP 411 00.
3. Diameter B - Wear	12.5025 inches diameter maximum	Any amount	Replace rubber strip per WP 411 00.
4. Diameter C - Wear	12.6225 inches diameter maximum	Any amount	Replace rubber strip per WP 411 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
5. Slot edges -			
Round bottom dents	0.020 inch deep, 0.250 inch long	0.040 inch deep	Blend repair per WP 411 00.
Nicks and dents	Not serviceable	0.040 inch deep	Blend repair per WP 411 00.

WORK PACKAGE

TECHNICAL PROCEDURES

VANE, FRONT COMPRESSOR STATOR VARIABLE; INLET BEARING,
COMPRESSOR STATOR; SHROUD BEARING, COMPRESSOR STATOR; AND
INLET BOLTS, SELF-LOCKING, HEX -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	15	3	15	4 - 9	0
2	0			10 Blank	15

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of front compressor stator variable inlet vane, inlet and shroud bearings, and inlet self locking bolts.

2. FRONT COMPRESSOR STATOR VARIABLE INLET VANE, INLET AND SHROUD BEARINGS, AND INLET SELF LOCKING BOLTS - INSPECTION.

(See Figure 1.)

- a. Ensure that variable vanes have been cleaned per WP 201 00.
- al. Fluorescent penetrant inspect variable vanes for cracks on a system currently qualified per MIL-STD-1823 at 90 percent probability of detection and 50 percent confidence level to surface length indication of 0.070 inch long. Refer to T.O. 2J-F100-9. No cracks allowed.
- b. Visually inspect variable vane using white light and 3X magnifying glass for surface damage and wear. See figure 1.
- c. Temporarily install bearings on vane shafts after cleaning. Inspect for (0.005) inch maximum allowable play (diametrical clearance). If limit is exceeded, check vanes and bushings to ensure individual parts wear has not been exceeded. By selective fits, mate bushings to vanes. Keep bushings with vanes in sets until assembly.
- d. Inspect square drive end of vane for wear by checking displacement between vane and front compressor inlet arm as follows:
 - (1) Hold vane vertically. Align drivers of arms and vanes.
 - (2) Bolt arm to vane fingertight, allowing arm to move.
 - (3) There shall be no angular displacement.
- e. Visually and dimensionally inspect bearings and bolts. See figure 1.

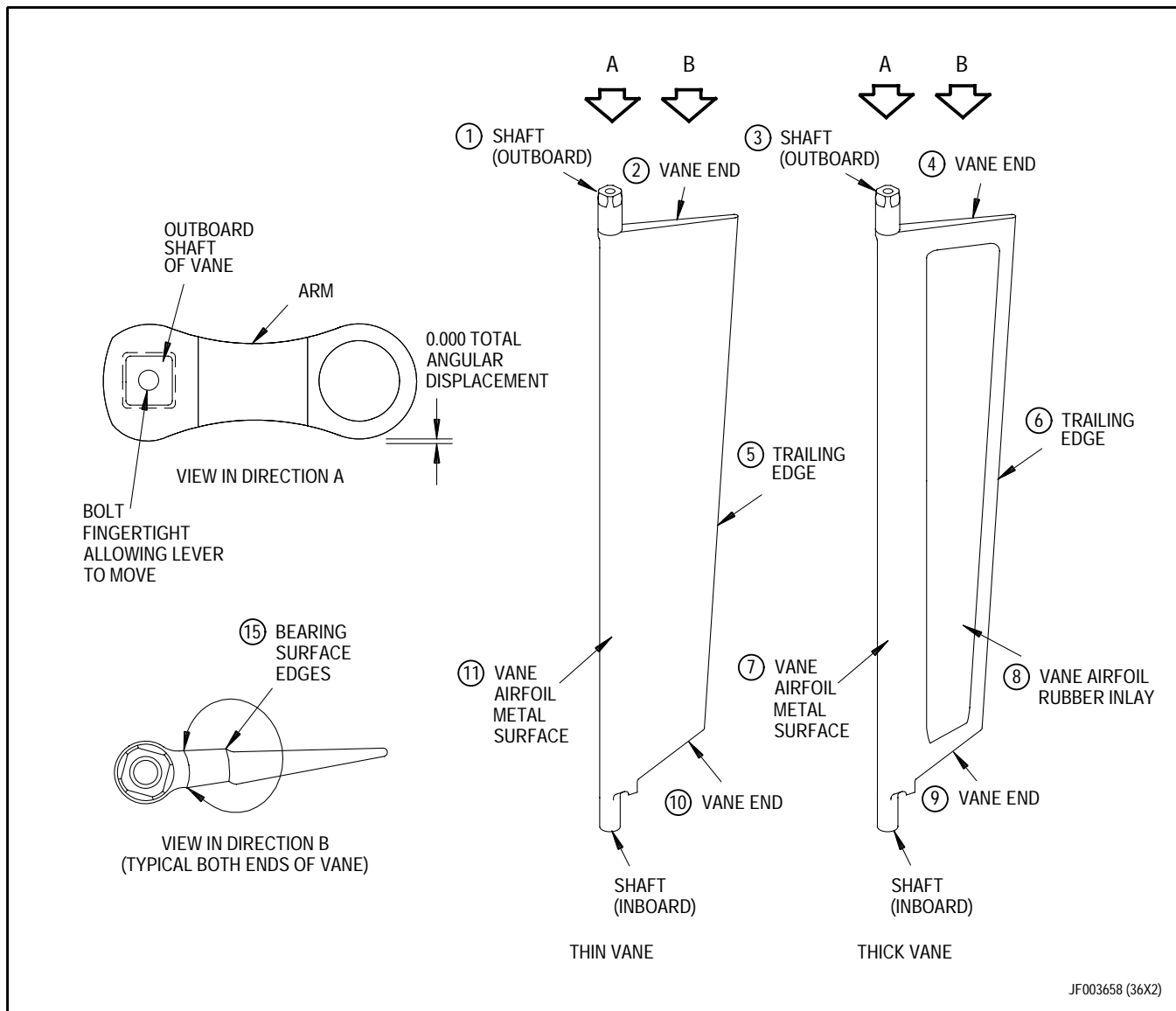
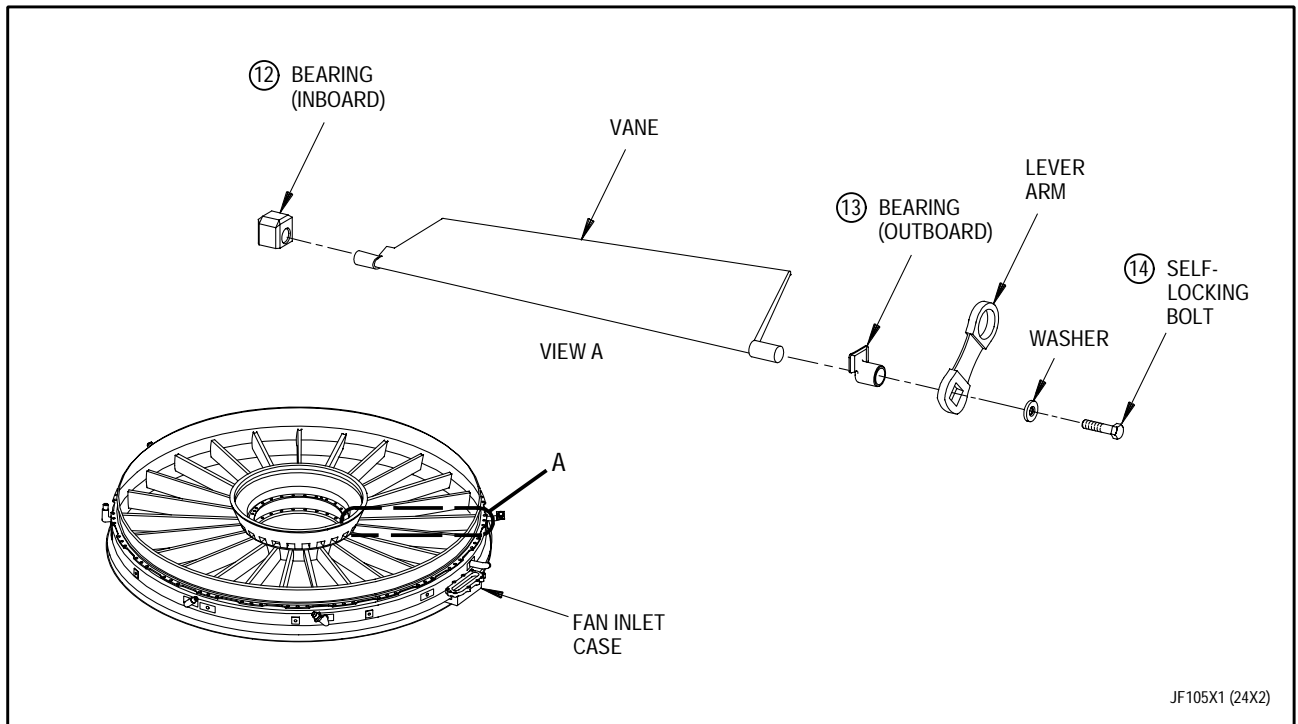


Figure 1. Front Compressor Stator Variable Inlet Vane, Inlet and Shroud Bearings, and Inlet Self-Locking Bolts - Inspection (Sheet 1 of 2)



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Shaft (Outboard) -			
Cracks (area around shaft base)	Not serviceable	Not repairable	Replace vane.
Cracks	Not serviceable	Not repairable	Replace vane.
2. Vane ends -			
Nicks, dents	Not serviceable	See corrective action.	Blend repair per WP 412 00.

Figure 1. Front Compressor Stator Variable Inlet Vane, Inlet and Shroud Bearings, and Inlet Self-Locking Bolts - Inspection (Sheet 2 of 2)

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3. Shaft (Outboard)			
Cracks	Not serviceable	Not reparable	Replace vane.
4. Vane ends -			
Nicks, dents	Not serviceable	See corrective action.	Blend repair per WP 412 00.
5. Trailing edge -			
Nicks and dents	0.015 inch deep, 0.020 inch wide. Any amount.	See corrective action.	Blend repair per WP 412 00.
6. Trailing edge -			
Nicks and dents	0.015 inch deep, 0.020 inch wide. Any amount.	See corrective action.	Blend repair per WP 412 00.
7. Vane airfoil metal surface -			
Round bottom dents without cracks, cuts or tears	0.030 inch maximum depth and 0.750 inch diameter maximum.	Not reparable	Replace vane.
Cracks	Not serviceable	Not reparable	Replace vane.
Nicks and scratches	0.015 inch deep, 0.020 inch wide. Any amount.	See corrective action.	Blend repair per WP 412 00.

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
8. Vane airfoil rubber inlay - Tears, cracks, or gouges	Minor cracks, gouges and surface discrepancies are serviceable provided:	Total damaged area must not exceed 3 square inches. Any 1 area can not exceed 1 square inch. No base metal exposed. See corrective action.	Repair rubber inlay per WP 412 00.
	a. Damage areas over the entire surface of the rubber inlay have no metal exposed.	Not reparable	Replace vane.
	b. Total damaged area must not exceed 3 square inches. Any one area can not exceed 1 square inch. No base metal exposed. See corrective action.		
	c. Damage areas are located at minimum distance of 0.125 inch from edge of inlay.		
	d. Damage areas are less than a maximum of 0.125 inch depth with no metal exposed.		
	e. Total damaged area does not exceed 0.500 square inch.		
Unbonding or soft spots	Not serviceable	Not reparable	Replace vane.

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
9. Vane ends -			
Nicks, dents	0.015 inch deep, 0.020 inch wide. Any amount.	See corrective action.	Blend repair per WP 412 00.
10. Vane ends -			
Nicks, dents	Not serviceable	See corrective action.	Blend repair per WP 412 00.
11. Vane airfoil metal surface -			
Round bottom dents without cracks, cuts or tears	Not serviceable	Not reparable	Replace vane.
Cracks	Not serviceable	Not reparable	Replace vane.
Nicks and scratches	Not serviceable	See corrective action.	Blend repair per WP 412 00.
12. Bearing (Inboard) -			
ID wear	0.004 inch maximum	Not reparable	Replace bearing.
Broken or chipped	Not serviceable	Not reparable	Replace bearing.
Cracked	Not serviceable	Not reparable	Replace bearing.
13. Bearing (Outboard) -			
ID wear	0.004 inch maximum	Not reparable	Replace bearing.
Cracked	Not serviceable	Not reparable	Replace bearing.
Missing shoulders	Not serviceable	Not reparable	Replace bearing.

Legend for figure 1 (continued)

Inspection Area Condition		Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
14.	Self-locking bolt - Locking insert	2 to 13 lb-in. run-on torque.	Not reparable	Replace bolt.
15.	Bearing surface edges - Nicks, dents	Not serviceable	0.010 inch deep	Blend repair per WP 412 00.

WORK PACKAGE**TECHNICAL PROCEDURES****SEAL, AIR, FRONT COMPRESSOR, INLET****INSPECTION****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	31	5	15	7 Added	31
4	0	6	31	8 Blank Added	31

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Evaluation System Reliability Assessment -	MIL-HDBK-1823
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Inlet Fan Module - - - - -	T.O. 2J-F100-53-6
Inlet/Fan Module - Cleaning - - - - -	WP 201 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of front compressor inlet air seal.

2. FRONT COMPRESSOR INLET AIR SEAL - INSPECTION.

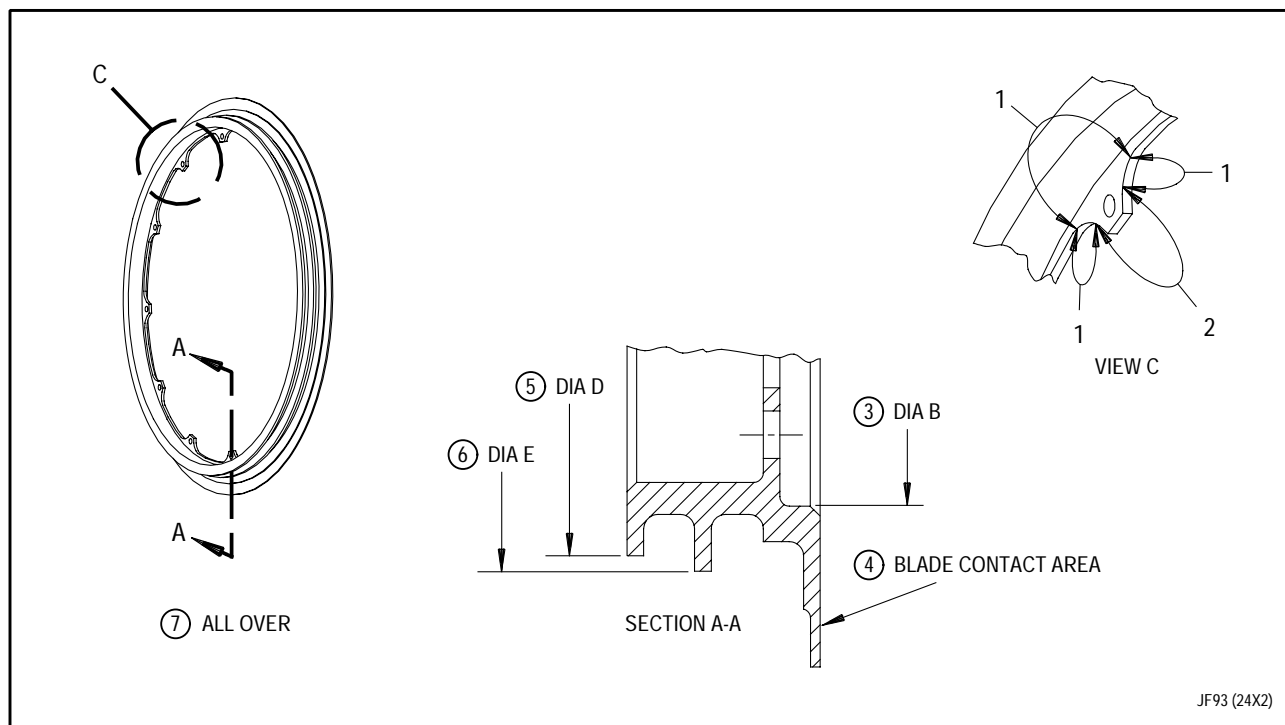
(See Figures 1 through 3.)

- a. Ensure that front compressor inlet air seal has been cleaned per WP 201 00.
- b. Visually inspect inlet air seal using white light and 3X magnifying glass for surface damage and wear. See figure 1.
- c. Fluorescent penetrant inspect front compressor inlet air seal for cracks on a system with capability defined in figure 2. Refer to T.O. 2J-F100-9. No cracks allowed.

NOTE

Primary inspection method of part scallops is FPI. ECI of scallops is optional.

- d. ECI inspect per paragraph 3., figure 3., as required.



Inspection Area Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Retainer attachment tang -			
Nicks and scratches	Not serviceable	Not reparable	Replace air seal.
2. Retainer attachment tang -			
Nicks and scratches	Not serviceable	Not reparable	Replace air seal.

Figure 1. Front Compressor Inlet Air Seal - Inspection

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Diameter B -			
Worn, damaged	11.982 inches diameter maximum	Not reparable	Replace air seal.
4. Blade contact area -			
Blade root profile impression	0.005 inch depth	Not reparable	Replace air seal.
5. Diameter D -			
Wear	12.4710 inches diameter minimum	Not reparable	Replace air seal.
6. Diameter E -			
Wear	12.5850 inches diameter minimum	Not reparable	Replace air seal.
7. All over -			
Cracks	Not serviceable	Not reparable	Replace air seal.
Nicks	Not serviceable	See corrective action.	Blend all nicks and scratches. Blend depth shall not exceed 0.015 inch. Replace air seal if damage exceeds blend limits.

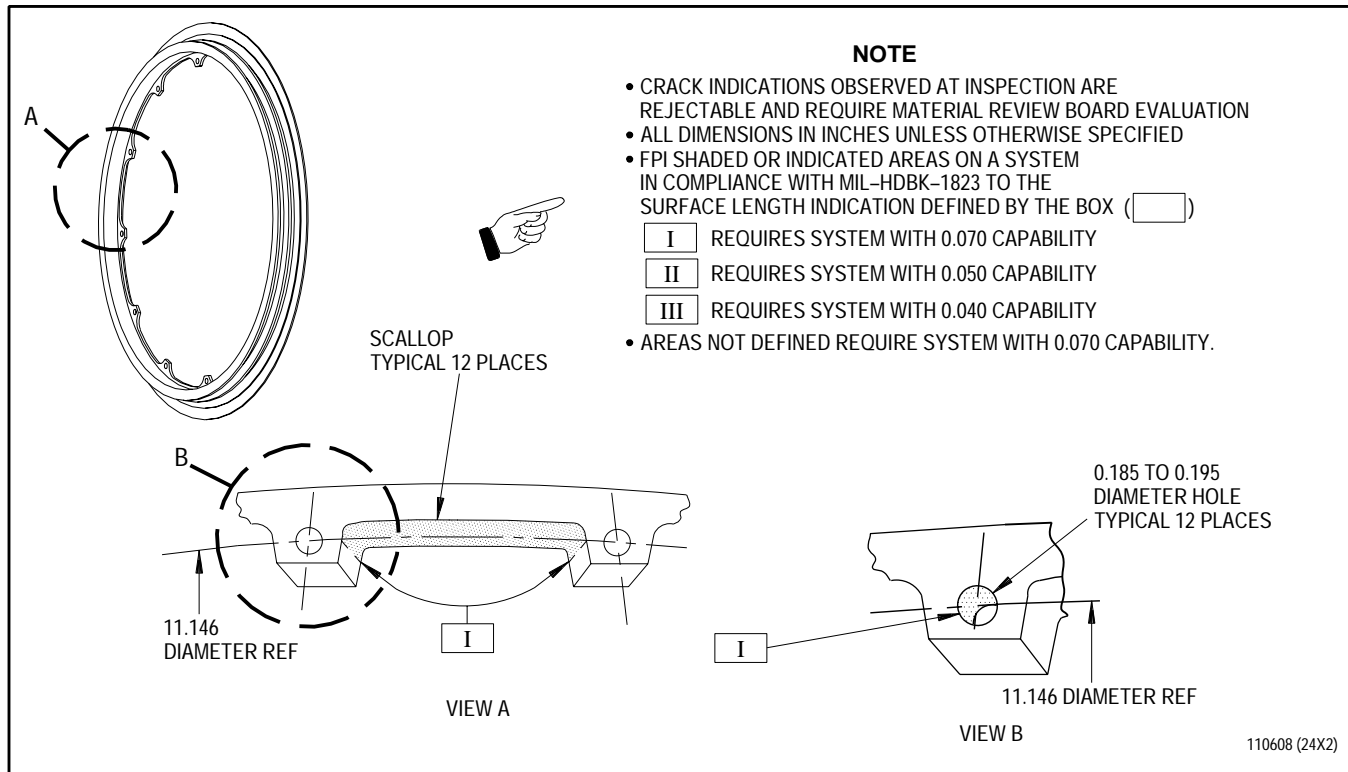
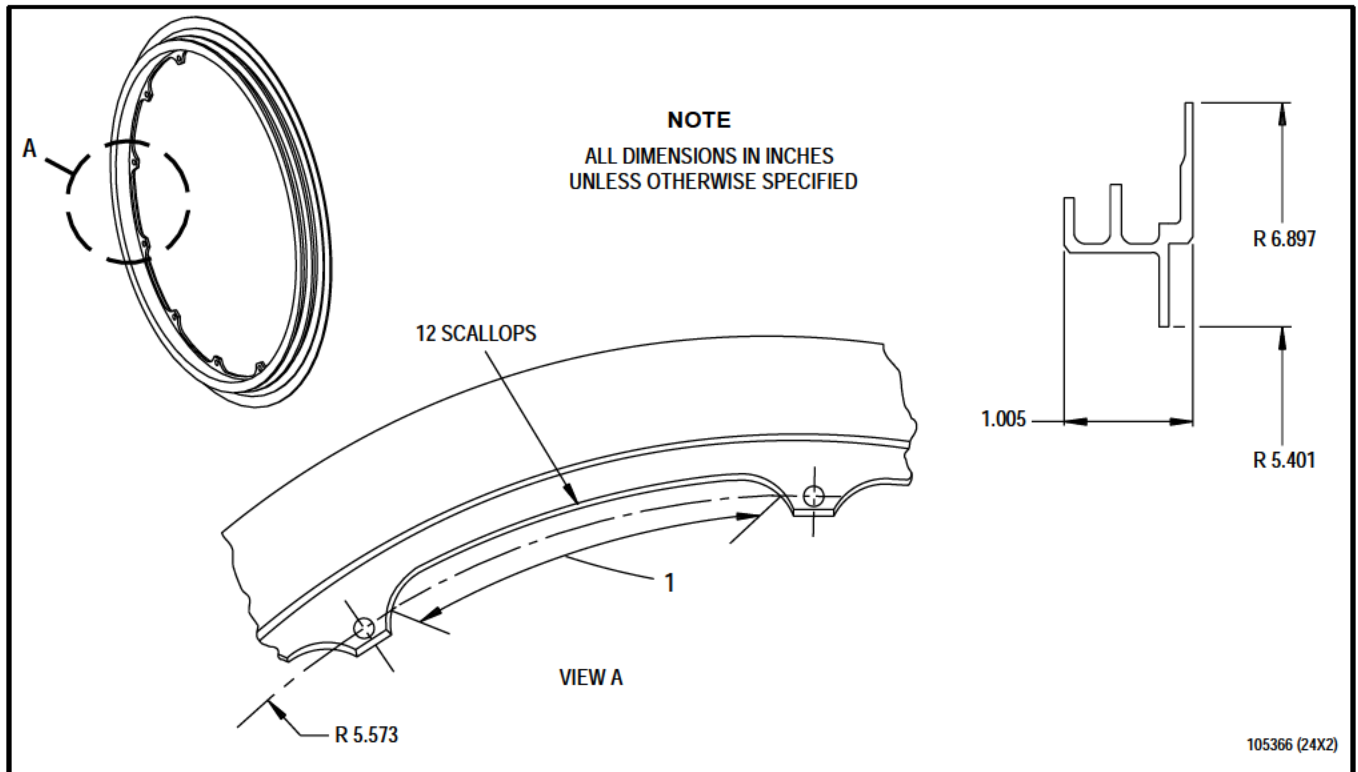


Figure 2. Front Compressor Inlet Air Seal - Required Fluorescent Penetrant System Capability

3. EDDY CURRENT INSPECTION USING PN 112366 FULLY AUTOMATED SYSTEM VERSION 3 FOR F100-PW-229 PN 4071080.

(See Figure 3.)

- Ensure that air seal has been cleaned per WP 201 00.
- Prepare ECIS and inspect part. Refer to T.O. 2J-F100-9, SWP 004 09, SWP 120 01.
- Evaluate inspection results per figure 3.



Inspection Area	*Maximum Flaw Depth (Inch)	Flaw Surface Orientation	ECIS System Rejection Limit		Corrective Action
			Threshold (Counts)	(a_{50} -inch)	
1. Scallops - 12 places	0.035	Axial & Radial	5531	0.0227	Replace part

*Eddy current inspect on system in compliance with MIL-HDBK-1823 at 90% probability of detection and 50% confidence level for required depth.

Figure 3. Seal-Air, Compressor, Rear, First Stage - Eddy Current Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL, AIR, COMPRESSOR, FIRST STAGE, REAR -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	31	5	15	7 Added	31
4	0	6	31	8 Blank Added	31

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Evaluation System Reliability Assessment -	MIL-HDBK-1823
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Inlet Fan Module - - - - -	T.O. 2J-F100-53-6
Inlet/Fan Module - Cleaning - - - - -	WP 201 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of compressor 1st stage rear air seal.

2. COMPRESSOR FIRST STAGE REAR AIR SEAL - INSPECTION.

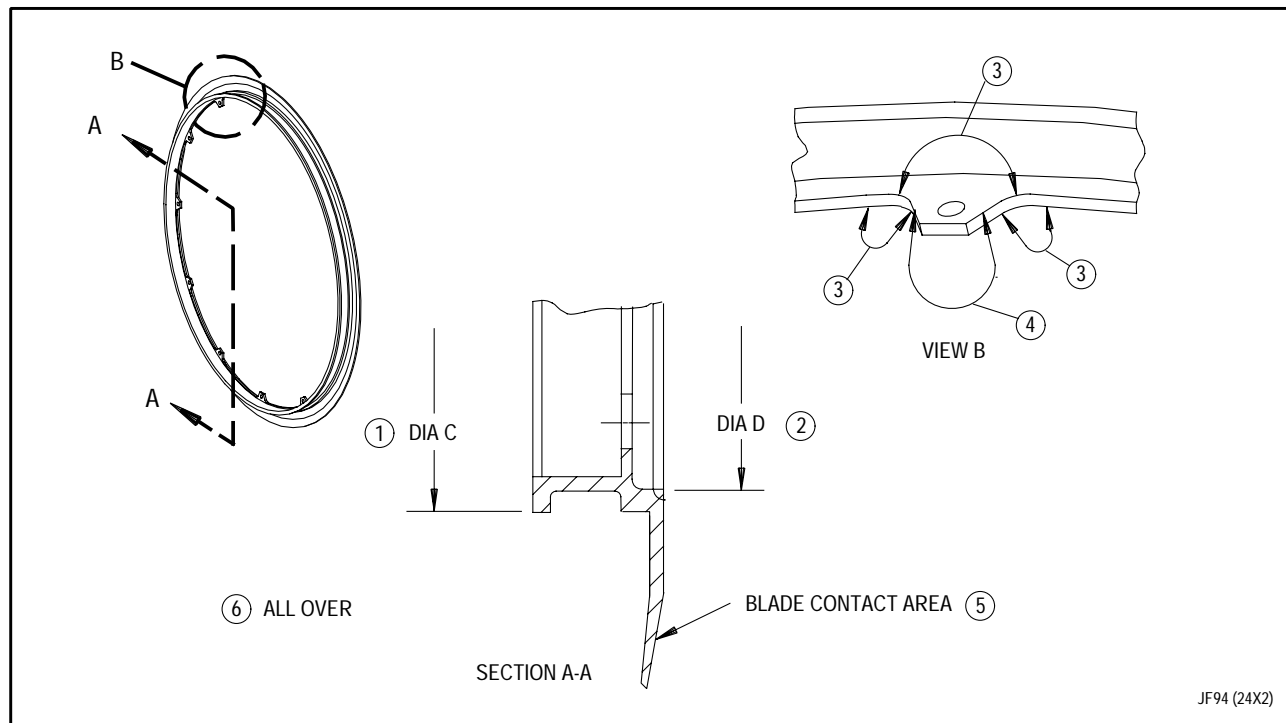
(See Figures 1 through 3.)

- a. Ensure that first stage rear air seal has been cleaned per WP 201 00.
- a1. Visually inspect first stage rear air seal using white light and 3X magnifying glass for surface damage and wear. See figure 1.
- b. Fluorescent penetrant inspect first stage rear air seal for cracks on a system with capability defined in figure 2. Refer to T.O. 2J-F100-9, SWP 004 03. No cracks allowed.

NOTE

Primary inspection method of part scallops is FPI. ECI of scallops is optional.

- c. ECI inspect per paragraph 3., figure 3., as required.



JF94 (24X2)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Diameter C -			
Wear	17.079 inches diameter minimum	Not repairable	Replace air seal.
2. Diameter D -			
Worn, damaged	16.866 inches diameter maximum	Not repairable	Replace air seal.
3. Retainer attachment tang -			
Nicks and scratches	Not serviceable	Not repairable	Replace air seal.

Figure 1. Compressor First Stage Rear Air Seal - Inspection

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Retainer attachment tang -			
Nicks and scratches	Not serviceable	Not reparable	Replace air seal.
5. Blade contact area -			
Blade root profile impression	0.005 inch depth	Not reparable	Replace air seal.
6. All over -			
Cracks	Not serviceable	Not reparable	Replace air seal.
Nicks	0.015 inch depth	Not reparable	Replace air seal.

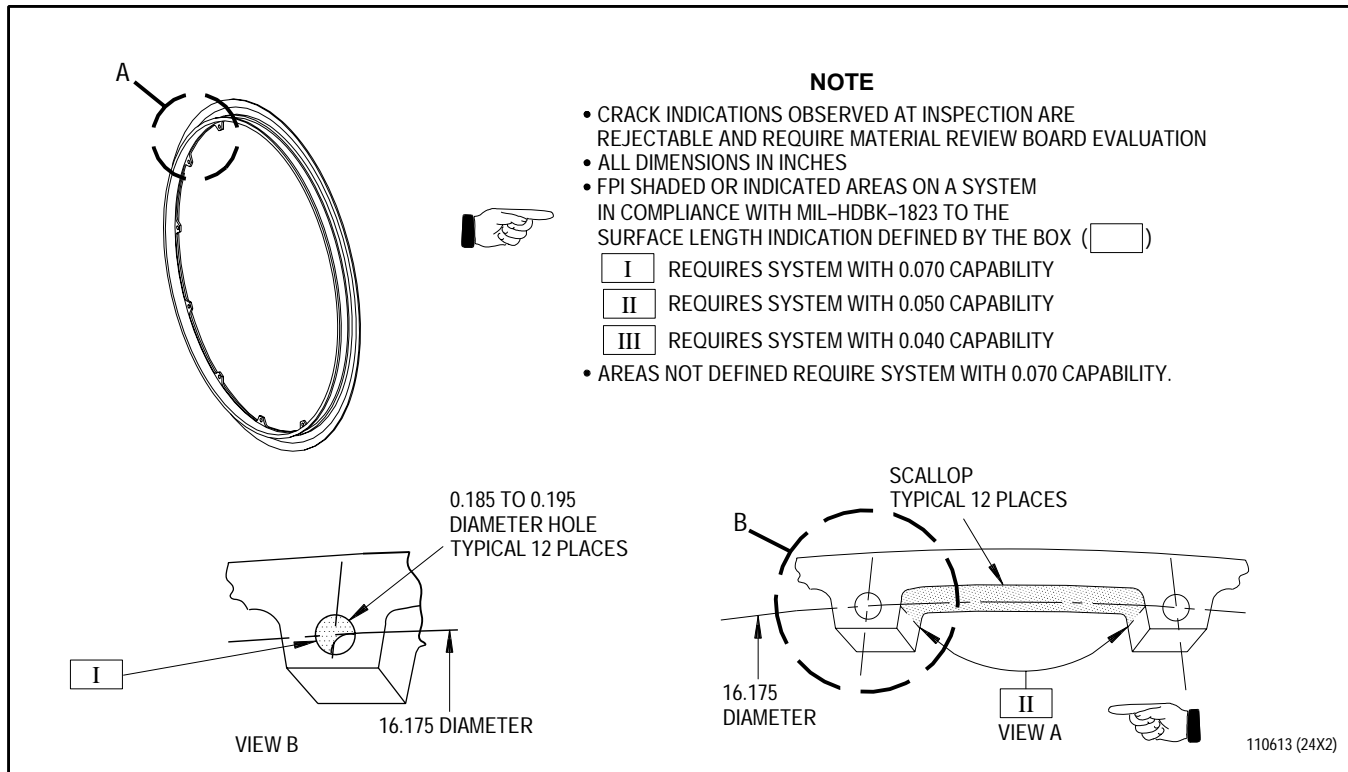
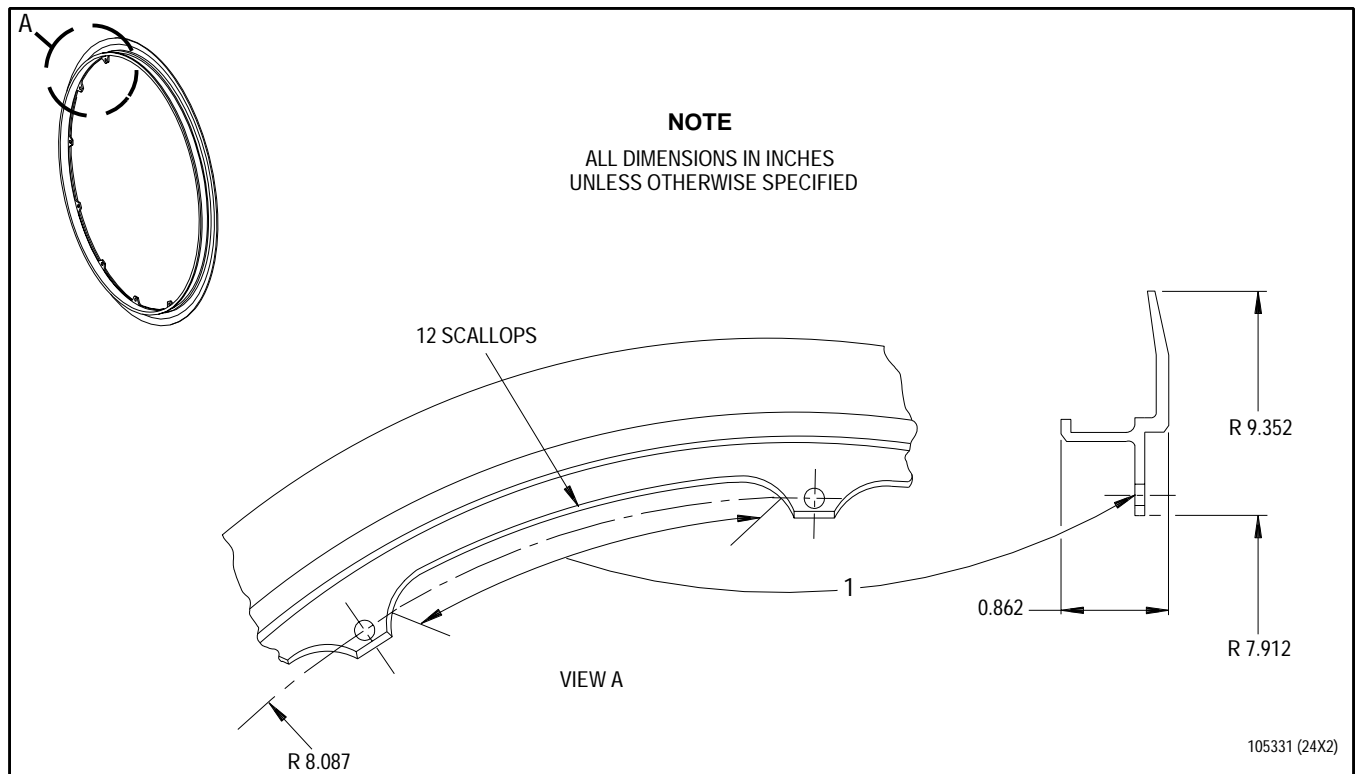


Figure 2. Compressor First Stage Rear Air Seal - Required Fluorescent Penetrant System Capability

3. EDDY CURRENT INSPECTION USING PN 112366 FULLY AUTOMATED SYSTEM VERSION 3 FOR F100-PW-229 PN 4071082 SCALLOPS.

(See Figure 3.)

- Ensure that air seal has been cleaned per WP 201 00.
- Prepare ECIS and inspect part. Refer to T.O. 2J-F100-9, SWP 004 09, SWP 122 01.
- Evaluate inspection results per figure 3.



ECIS System Rejection Limit					
Inspection Area	*Maximum Flaw Depth (Inch)	Flaw Surface Orientation	Threshold (Counts)	(a ₅₀ -inch)	Corrective Action
1. Scallops - 12 places	0.030	Axial & Radial	4061	0.0160	Replace part

*Eddy current inspect on system in compliance with MIL-HDBK-1823..

Figure 3. Compressor First Stage Rear Air Seal - Eddy Current Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

BLADES, COMPRESSOR ROTOR (FIRST, SECOND, AND THIRD STAGES) -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	26	3 - 10	26	11 - 12 Deleted	26
2	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
Marking, General - - - - -	WP 023 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of compressor rotor blades (stages 1 through 3).

2. COMPRESSOR ROTOR BLADES (STAGES ONE THROUGH THREE) - INSPECTION.

(See Figures 1 through 3.)

- a. Ensure that blades have been cleaned per WP 201 00.
- b. Strip coating off blade root per WP 415 00 prior to inspection for galling/fretting.
- c. Visually inspect compressor rotor blades using white light and 3X magnifying glass. See figure 1.
- d. Fluorescent penetrant inspect compressor rotor blades for cracks on a system currently qualified per MIL-STD-1823 at 90% probability of detection and 50% confidence level to surface length indication of 0.070 inch long. Refer to T.O. 2J-F100-9. No cracks allowed.
- e. Coat blade root per WP 415 00 after completing inspection and repair.

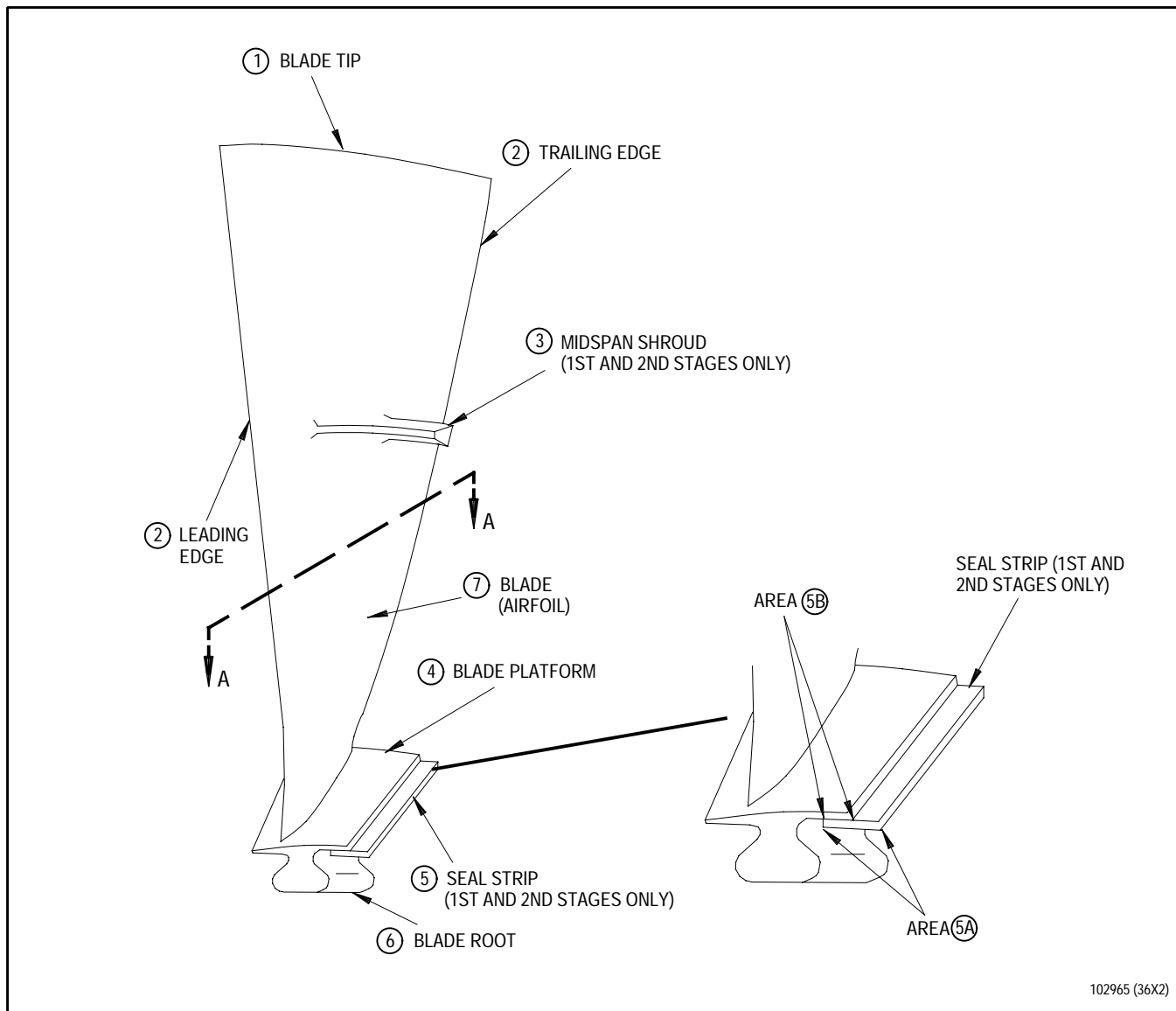
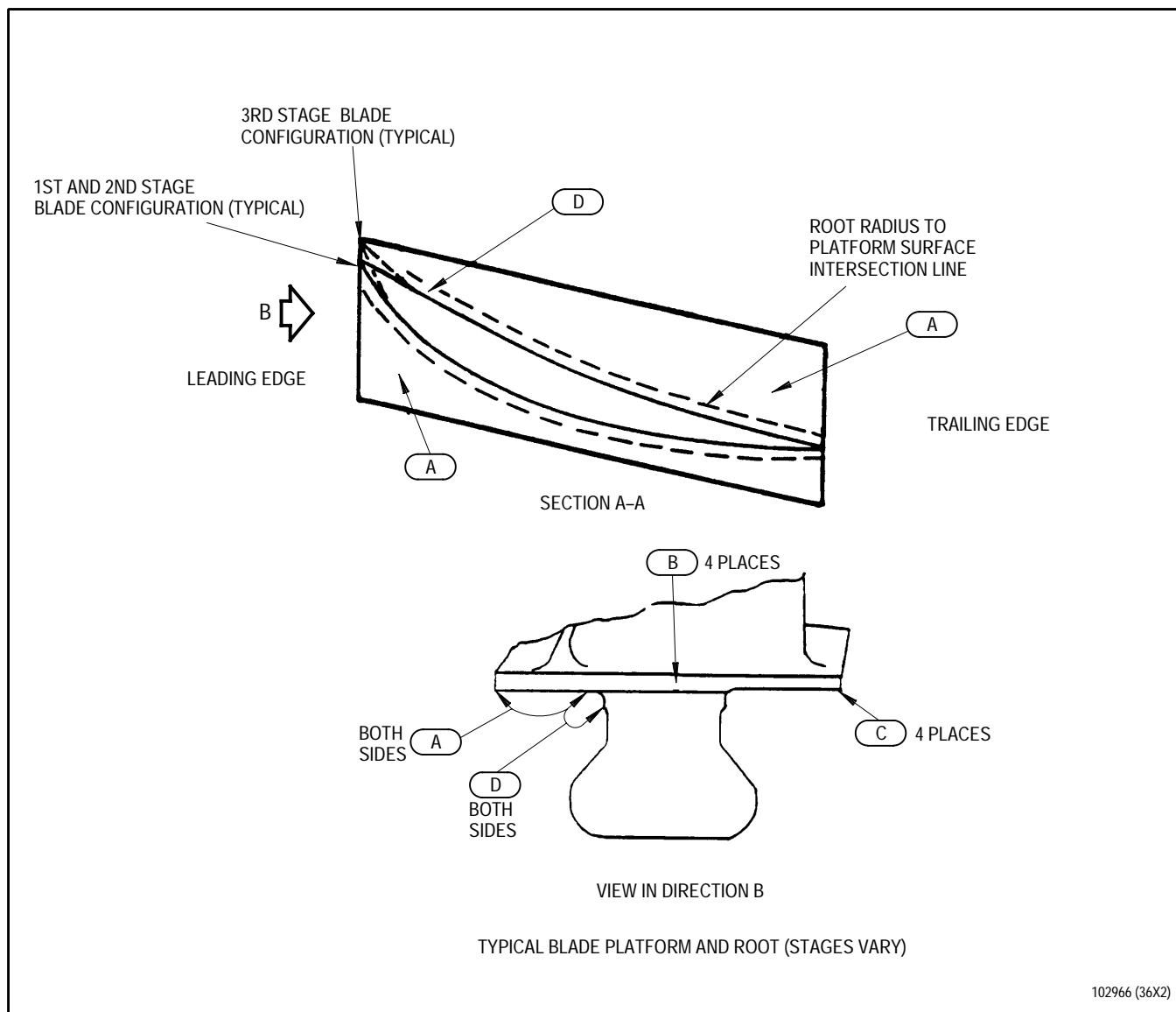


Figure 1. Compressor Rotor Blades (Stages One Through Three) - Inspection (Sheet 1 of 2)



- Area A. Blade platform, airfoil side and root side
- Area B. Blade platform, edges (4 sides)
- Area C. Blade platform, corners
- Area D. Blade platform, airfoil radius and root radius

Figure 1. Compressor Rotor Blades (Stages One Through Three) - Inspection (Sheet 2 of 2)

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Blade tips -			
Blue discoloration caused by blades rubbing shroud	Serviceable	None	None
Bent, bowed, curled	Not serviceable	Not reparable	Replace blade.
Nicks, dents	See figures 2 and 3.	See corrective action.	Blend repair per WP 415 00.
Tip groove wear caused by blades rubbing on shroud	0.003 inch maximum depth for 1st and 2nd stage blades, 0.025 inch maximum depth for 3rd stage blades	Not reparable	Replace blade.
2. Leading and trailing edges -			
Nicks, tears, round-bottom dents	See figures 2 and 3.	See corrective action.	Blend repair per WP 415 00.
3. Midspan shroud (1st and 2nd stage blades only) -			
Nicks, dents	See figure 2.	Any amount	Blend repair per WP 415 00.
Chipping and cracking of hardface coating on ends of blade midspan shroud	Not serviceable	Any amount	Replace hardface per WP 415 00.
Pitting of hardface coating on ends of blade midspan shroud	15% of total surface	Any amount	Replace hardface per WP 415 00.
Wear of hardface coating	95% of total surface (A non-worn surface will have a matte finish, typical of plasma spray finish. A worn surface will have a shiny, polished finish.)	Any amount	Replace hardface per WP 415 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Blade platform -			
Area A			
Scratches	0.125 inch length, 0.007 inch depth	0.020 inch depth	Blend repair per WP 415 00.
Nicks	0.015 inch diameter or length, 0.007 inch depth	0.020 inch depth	Blend repair per WP 415 00.
Dents	3 locations, 0.125 inch diameter or length, 0.007 inch depth with round edges, corners, and bottom with no raised material	0.020 inch depth	Blend repair per WP 415 00.
Area B			
Scratches	0.100 inch length, 0.007 inch depth	0.020 inch depth	Blend repair per WP 415 00.
Nicks	0.015 inch diameter or length, 0.007 inch depth	0.020 inch depth	Blend repair per WP 415 00.
Dents	0.100 inch diameter or length, 0.007 inch depth with round edges, corners, and bottom with no raised material	0.020 inch depth	Blend repair per WP 415 00.
Area C			
Nicks, dents (all corners of all blades except 3rd stage blade corner near airfoil leading edge)	0.007 inch depth with round edges, corners, and bottom with no raised material	0.020 inch depth	Blend repair per WP 415 00.
Nicks, dents (3rd stage blade corner near airfoil leading edge)	None allowed except those visible using magnifying glass	Not reparable	Replace blade.
Area D			
Scratches, nicks, dents	See figures 2 and 3.	Not reparable	Replace blade.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
5. Seal strip (1st and 2nd stage blades only) -			
Corners (Area 5A) damaged, frayed, loose	0.100 inch length, 0.100 inch width.	See corrective action.	Replace seal strip per WP 415 00.
Bond line (Area 5B, all edges of seal strip) minor voids or excessive sealant	Serviceable as long as seal strip is securely bonded.	See corrective action.	Replace seal strip per WP 415 00.
6. Blade root -			
Galling/fretting	Not serviceable	Not repairable	Replace galled blade. Recoat serviceable blade roots per WP 415 00.
Cracks	Not serviceable	Not repairable	Replace blade.
Nicks, dents (1st and 2nd stage blades)	See figure 2, Area D.	Not repairable	Replace blade.
Nicks, dents (3rd stage blades)	Not serviceable	Not repairable	Replace blade.
7. Blade -			
Cracks	Not serviceable	Not repairable	Replace blade.
Bent, bowed	Not serviceable	Not repairable	Replace blade.
Nicks, dents	See figures 2 and 3.	See corrective action.	Blend repair per WP 415 00.

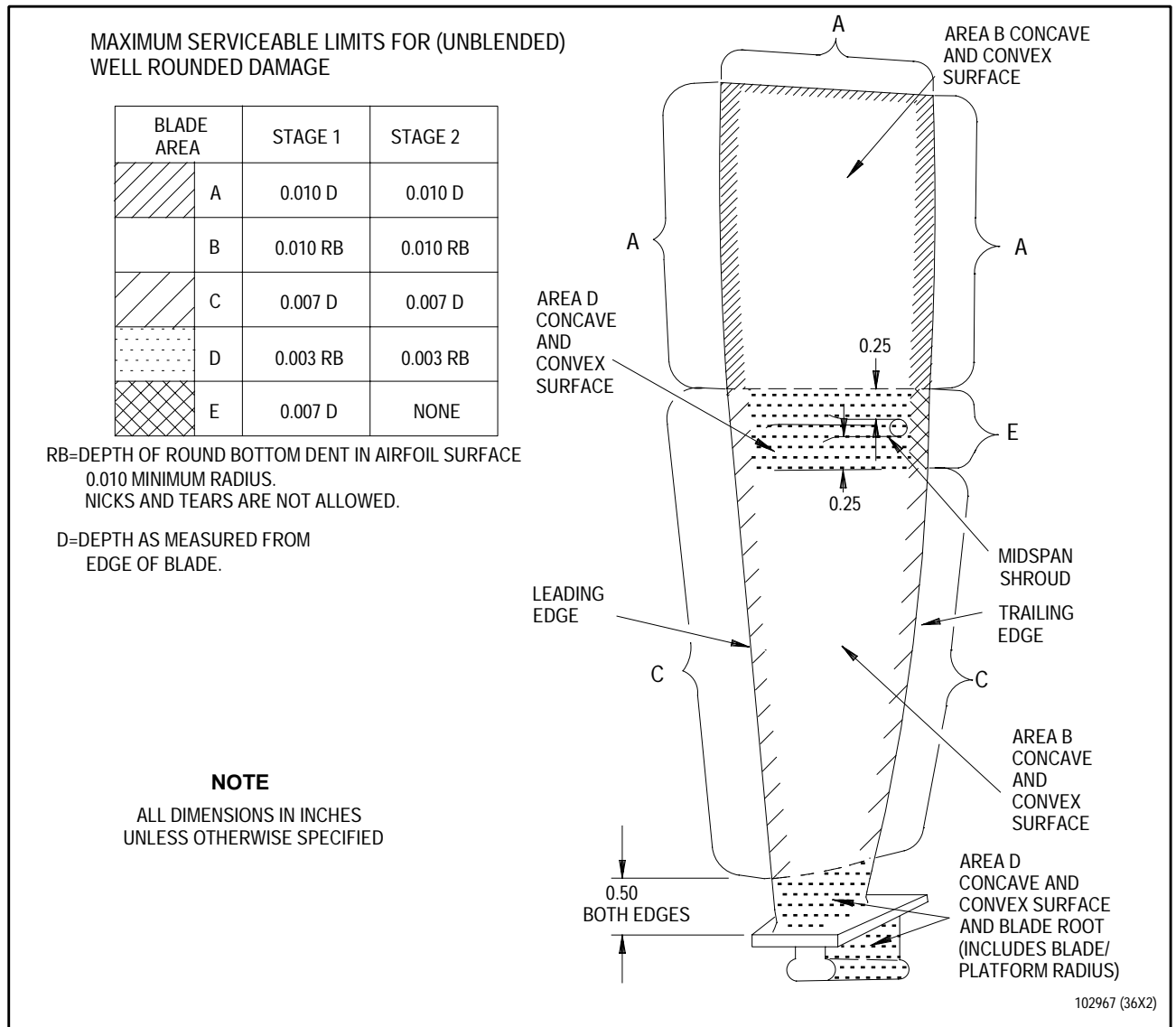






Figure 2. First and Second Stage Compressor Rotor Blades - Serviceable Limits For Unblended Damage

MAXIMUM SERVICEABLE LIMITS FOR (UNBLENDED)
WELL ROUNDED DAMAGE

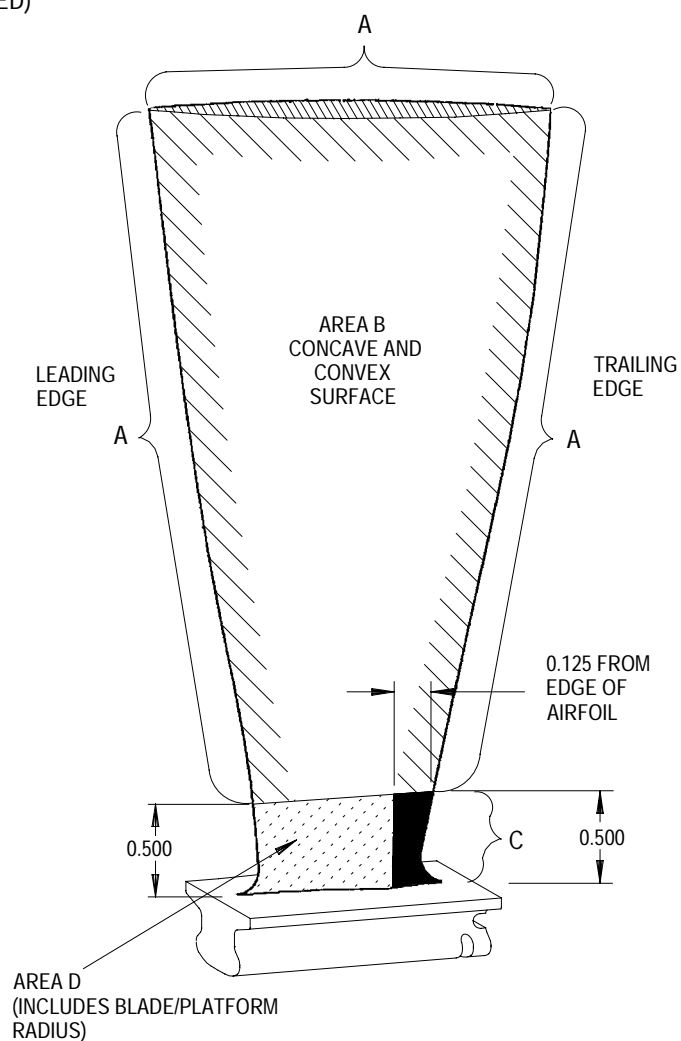
BLADE AREA		STAGE 3
	A	0.010 D
	B	0.010 RB
	C	NONE
	D	0.003 RB

RB=DEPTH OF ROUND BOTTOM DENT IN AIRFOIL SURFACE
0.010 MINIMUM RADIUS.
NICKS AND TEARS ARE NOT ALLOWED.

D=DEPTH AS MEASURED FROM
EDGE OF BLADE.

NOTE

ALL DIMENSIONS IN INCHES
UNLESS OTHERWISE SPECIFIED



98811 (36X2)

Figure 3. Third Stage Compressor Rotor Blades - Serviceable Limits For Unblended Damage

Pages 11 and 12 deleted.

WORK PACKAGE**TECHNICAL PROCEDURES****SEAL, AIR, FAN (FIRST, SECOND, AND THIRD STAGES) -****INSPECTION****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 16

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	26	8	26	13 - 14	18
2 - 5	18	9 - 10	18	15 Added	26
6	26	11 - 12	26	16 Blank Added	26
7	18				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2-1-111

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

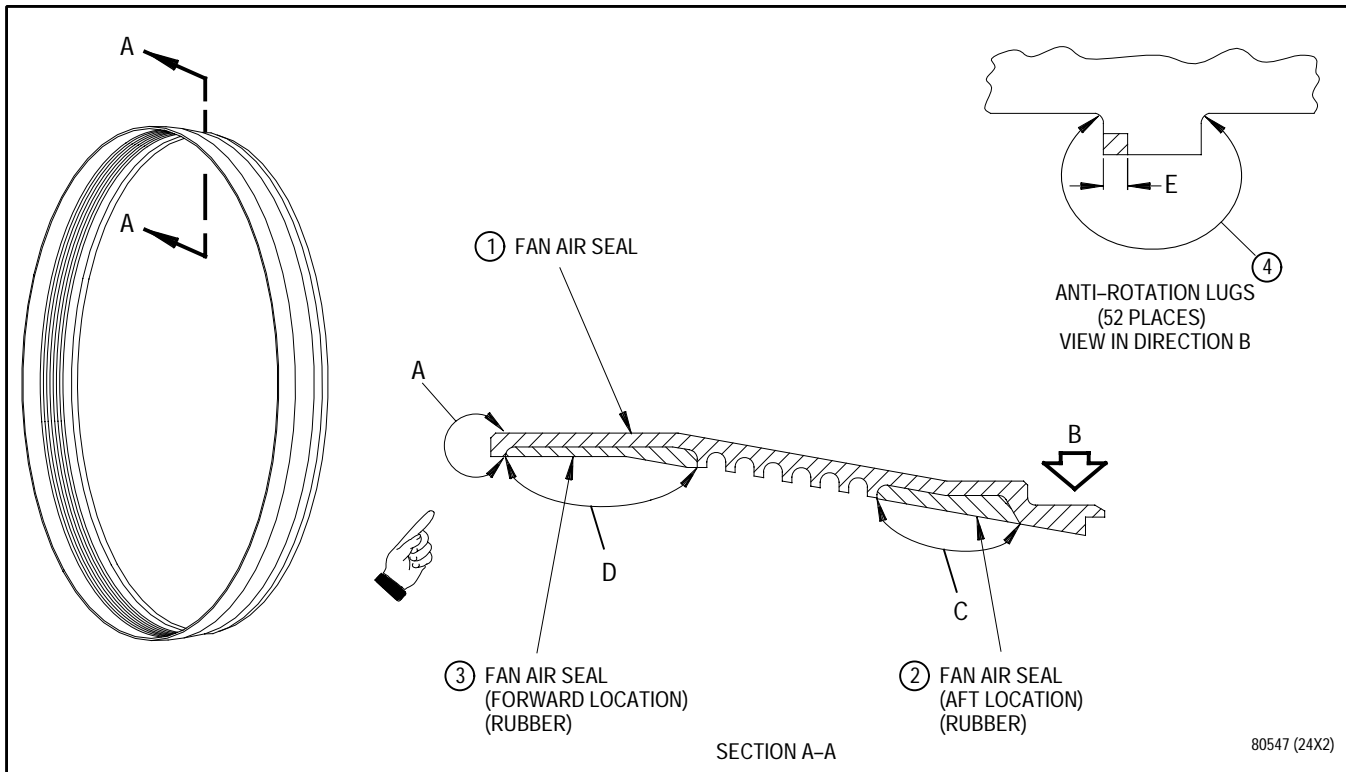
- a. This work package contains instruction for inspection of 1st, 2nd, and 3rd stage fan air seals.

2. FIRST, SECOND, AND THIRD STAGE FAN AIR SEALS - INSPECTION.

(See Figures 1, 2, and 3.)

- a. Ensure that air seals have been cleaned per WP 201 00.

- b. Fluorescent penetrant inspect fan air seals for cracks. Refer to T.O. 2-1-111, SPOP 82. No cracks allowed.
- c. Visually inspect fan air seals using white light and 3X magnifying glass for surface damage and wear. See figure 1.



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Fan Air Seal - Cracks	Not serviceable	Not repairable	Replace air seal.
Round bottom dents	Serviceable if less than 0.030 inch deep and 0.750 inch diameter.	Not repairable	Replace air seal.
Nicks, dents, scratches and minor damage	0.005 inch deep with no raised metal	0.025 inch deep	Blend repair per WP 416 00.
Wear in Area A	Any amount permitted	-	-

Figure 1. First Stage Fan Air Seal - Inspection

Legend for figure 1 (continued)

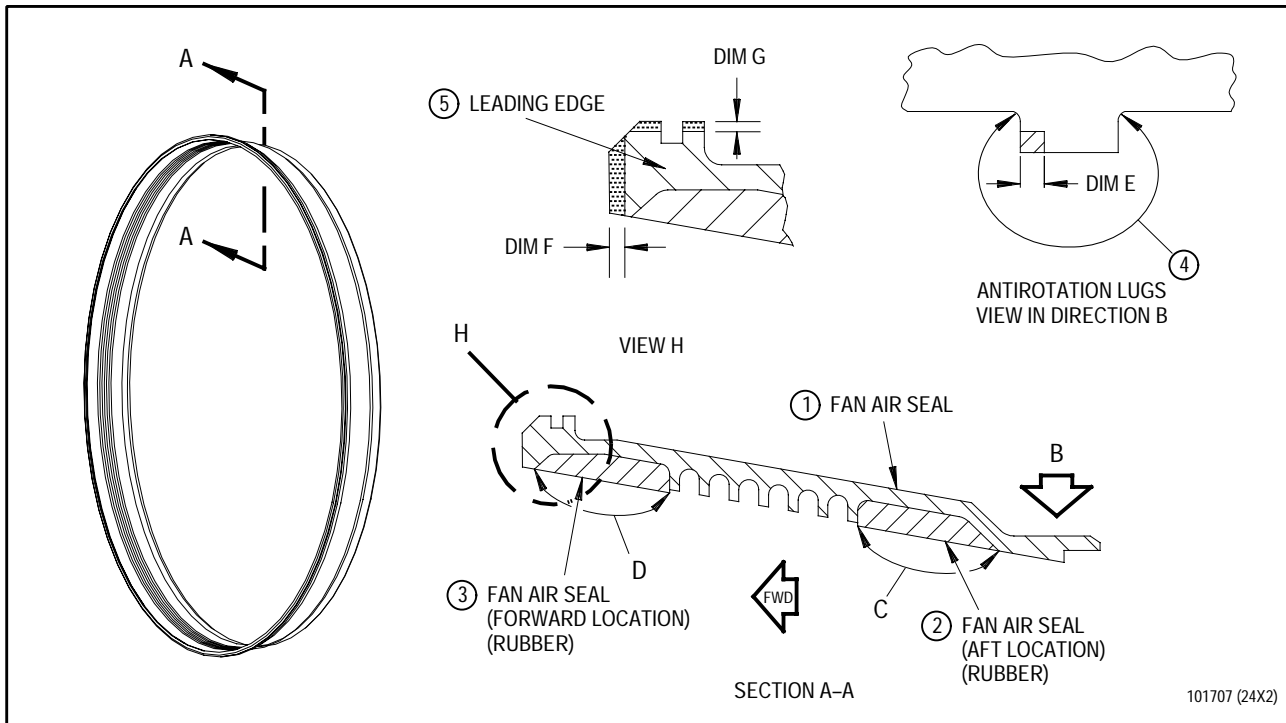
Inspection Area Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. Fan air seal (aft location) (rubber) Area C -			
Grooving or wear	0.030 inch deep over 360 degrees circumference.	Any amount	Replace air seal rubber per WP 416 00.
Damage	a. Shallow damage (damage that does not extend into base metal) that does not extend across seal is acceptable.	1. Shallow damage (damage that does not extend into base metal) •40% of total surface. •Any one area does not exceed two square inches. 2. Heavy damage (damage extending through to base metal) •10% of total surface. •Any one area does not exceed two square inches.	Patch repair air seal per WP 416 00.
	b. Any one area may not be larger than 0.500 square inch.	Any amount	Replace air seal rubber per WP 416 00.
	c. Not more than three areas of damage separated by four inches of securely bonded rubber are acceptable.	Any amount	Replace air seal rubber per WP 416 00.
Rubber strip unbonding	Not serviceable	Any amount	Replace air seal rubber per WP 416 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Fan air seal (forward location) (Rubber) Area D -			
Grooving or wear	0.050 inch deep over 360 degrees circumference	Any amount	Replace air seal rubber per WP 416 00.
Damage	a. Shallow damage (damage that does not extend into base metal) that does not extend across seal is acceptable.	1. Shallow damage (damage that does not extend into base metal) <ul style="list-style-type: none"> • 40% of total surface. • Any one area does not exceed two square inches. 2. Heavy damage (damage extending through to base metal) <ul style="list-style-type: none"> • 10% of total surface. • Any one area does not exceed two square inches. 	Patch repair air seal per WP 416 00.
	b. Any one area may not be larger than 0.500 square inch.	Any amount	Replace air seal rubber per WP 416 00.
	c. Not more than three areas of damage separated by four inches of securely bonded rubber are acceptable.	Any amount	Replace air seal rubber per WP 416 00.
Rubber strip unbonding	Not serviceable	Any amount	Replace air seal rubber per WP 416 00.

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
4. Anti-rotation slot edges-			
Nicks, dents and raised metal scratches	Not serviceable	0.025 inch per side	Blend repair per WP 416 00.
Wear resulting in Dimension E	Up to 0.025 inch maximum for Dimension E	Not repairable	Replace air seal.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Fan air seal - Cracks	Not serviceable	Not repairable	Replace air seal.
Round bottom dents	Serviceable if less than 0.030 inch deep and 0.750 inch diameter.	Not repairable	Replace air seal.
Nicks, dents, scratches and other minor damage	0.005 inch deep with no raised metal	0.025 inch deep	Blend repair per WP 416 00.

Figure 2. Second Stage Fan Air Seal - Inspection

Legend for figure 2 (continued)

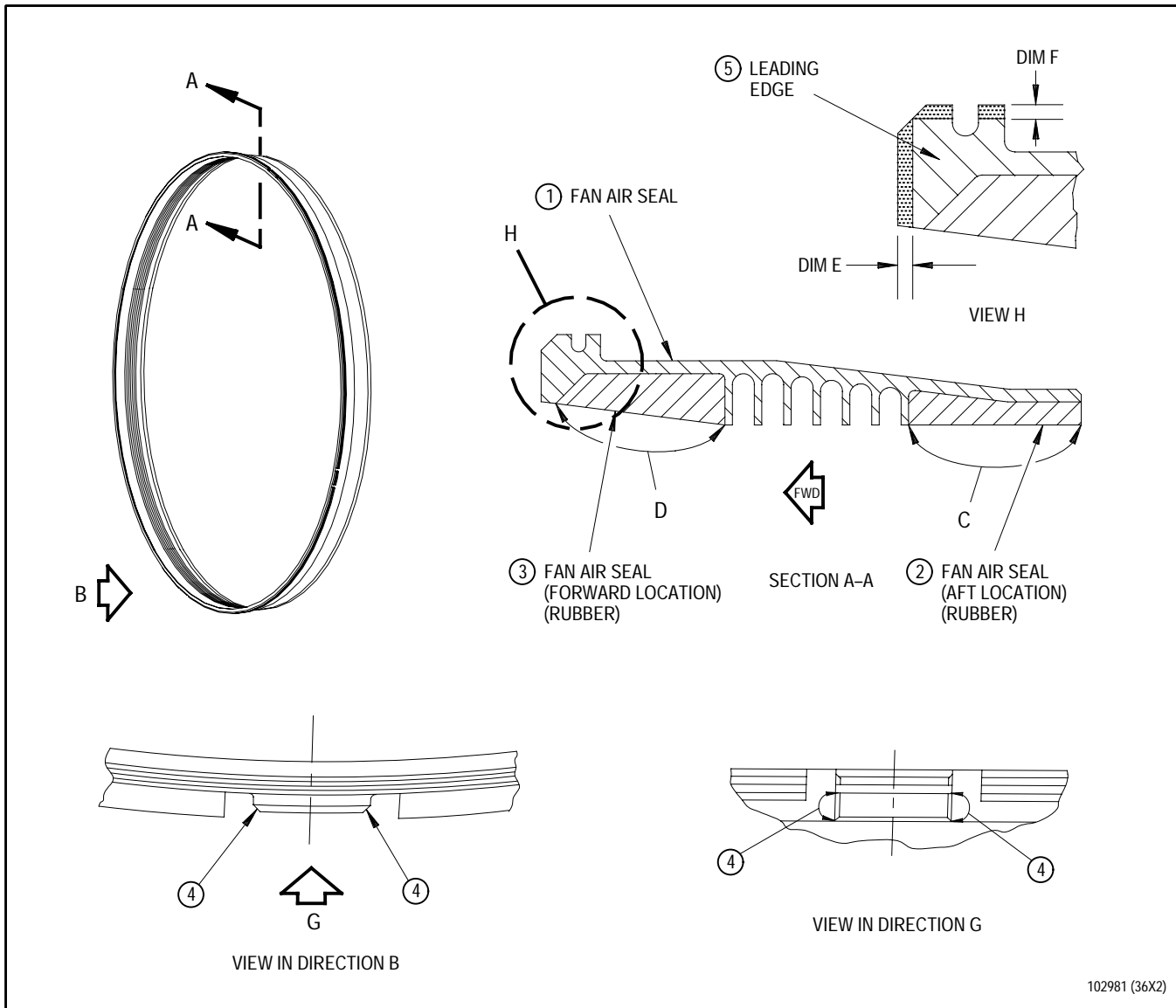
Inspection Area Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
2. Fan air seal (aft location) (rubber) Area C -			
Grooving or wear	0.020 inch deep over 360 degrees circumference	Any amount	Replace air seal rubber per WP 416 00.
Damage	a. Shallow damage (damage that does not extend into base metal) that does not extend across seal is acceptable.	1. Shallow damage (damage that does not extend into base metal) •40% of total surface. •Any one area does not exceed two square inches. 2. Heavy damage (damage extending through to base metal) •10% of total surface. •Any one area does not exceed two square inches.	Patch repair air seal per WP 416 00.
	b. Any one area may not be larger than 0.500 square inch.	Any amount	Replace air seal rubber per WP 416 00.
	c. Not more than three areas of damage separated by four inches of securely bonded rubber are acceptable.	Any amount	Replace air seal rubber per WP 416 00.
Rubber strip unbonding	Not serviceable	Any amount	Replace air seal rubber per WP 416 00.

Legend for figure 2 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Fan air seal (forward location) (Rubber) Area D -			
Grooving or wear	0.020 inch deep over 360 degrees circumference	Any amount	Replace air seal rubber per WP 416 00.
Damage	a. Shallow damage (damage that does not extend into base metal) that does not extend across seal is acceptable.	1. Shallow damage (damage that does not extend into base metal) •40% of total surface. •Any one area does not exceed two square inches. 2. Heavy damage (damage extending through to base metal) •10% of total surface. •Any one area does not exceed two square inches.	Patch repair air seal per WP 416 00.
	b. Any one area may not be larger than 0.500 square inch.	Any amount	Replace air seal rubber per WP 416 00.
	c. Not more than three areas of damage separated by four inches of securely bonded rubber are acceptable.	Any amount	Replace air seal rubber per WP 416 00.
Rubber strip unbonding	Not serviceable	Any amount	Replace air seal rubber per WP 416 00.

Legend for figure 2 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Antirotation lugs -			
Nicks, dents and raised metal scratches	Not serviceable	0.025 inch per side	Blend repair per WP 416 00.
Wear resulting in Dimension E	Up to 0.010 inch maximum for Dimension E	Not reparable	Replace air seal.
5. Leading edge -			
Wear resulting in Dimension F	0.020 inch	Not reparable	Replace air seal.
Wear resulting in Dimension G	0.030 inch	Not reparable	Replace air seal.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Fan air seal -			
Cracks	Not serviceable	Not repairable	Replace air seal.
Round bottom dents	Serviceable if less than 0.030 inch deep and 0.750 inch diameter.	Not repairable	Replace air seal.
Nicks, dents, scratches and other minor surface damage	0.005 inch deep with no raised metal.	0.025 inch deep	Blend repair per WP 416 00.

Figure 3. Third Stage Fan Air Seal - Inspection

Legend for figure 3 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
2. Fan air seal (aft location) (rubber) Area C -			
Grooving or wear	0.020 inch deep over 360 degrees circumference.	Any amount	Replace air seal rubber per WP 416 00.
Damage	a. Shallow damage (damage that does not extend into base metal) that does not extend across seal is acceptable.	1. Shallow damage (damage that does not extend into base metal) •40% of total surface. •Any one area does not exceed two square inches. 2. Heavy damage (damage extending through to base metal) •10% of total surface. •Any one area does not exceed two square inches.	Patch repair air seal per WP 416 00.
	b. Any one area may not be larger than 0.500 square inch.	Any amount	Replace air seal rubber per WP 416 00.
	c. Not more than three areas of damage separated by four inches of securely bonded rubber are acceptable.	Any amount	Replace air seal rubber per WP 416 00.
Rubber Strip Unbonding	Not serviceable	Any amount	Replace air seal rubber per WP 416 00.

Legend for figure 3 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Fan air seal (forward location) (Rubber) Area D -			
Grooving or wear	0.020 inch deep over 360 degrees circumference.	Any amount	Replace air seal rubber per WP 416 00.
Damage	a. Shallow damage (damage that does not extend into base metal) that does not extend across seal is acceptable.	1. Shallow damage (damage that does not extend into base metal) •40% of total surface. •Any one area does not exceed two square inches. 2. Heavy damage (damage extending through to base metal) •10% of total surface. •Any one area does not exceed two square inches.	Patch repair air seal per WP 416 00.
	b. Any one area may not be larger than 0.500 square inch.	Any amount	Replace air seal rubber per WP 416 00.
	c. Not more than three areas of damage separated by four inches of securely bonded rubber are acceptable.	Any amount	Replace air seal rubber per WP 416 00.
Rubber Strip Unbonding	Not serviceable	Any amount	Replace air seal rubber per WP 416 00.
4. Anti-rotation slot edges -			
Nicks, dents and raised metal scratches	Not serviceable	0.025 inch per side	Blend repair per WP 416 00.
Wear	0.010 inch deep	Not repairable	Replace air seal.

Legend for figure 3 (continued)

Inspection Area - Condition		Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
5.	Leading edge			
	Wear resulting in Dimension E	0.020 inch	Not reparable	Replace air seal.
	Wear resulting in Dimension F	0.030 inch	Not reparable	Replace air seal.

WORK PACKAGE

TECHNICAL PROCEDURES

LOCK, COMPRESSOR STATOR (FIRST AND SECOND STAGES) -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	0	4	Blank	0	

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

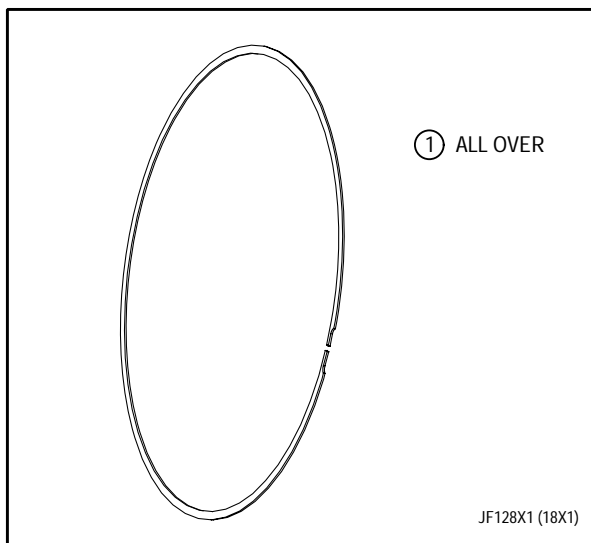
1. INTRODUCTION.

- a. This work package contains instructions for inspection of 1st and 2nd stage compressor stator locks.

2. COMPRESSOR STATOR LOCK (FIRST AND SECOND STAGES) - INSPECTION.

(See Figure 1.)

- a. Inspect lock for cracks using fluorescent penetrant method. Refer to T.O. 2J-F100-9. No cracks allowed.
- b. Visually inspect lock using white light and 3X magnifying glass for surface damage and wear. See figure 1.



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All over -			
Cracked	Not serviceable	Not reparable	Replace lock.
Nicks, dents and scratches	Up to 0.010 inch deep	Not reparable	Replace lock.

Figure 1. Compressor Stator Lock (First and Second Stages) - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

COMPRESSOR STATOR ASSEMBLY (FIRST AND SECOND STAGES) -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	26	4	26	5 - 7	24
2 - 3	24			8	26

REFERENCE MATERIAL REQUIRED

Title	Number
STANDARD MAINTENANCE PROCEDURES - - - - -	T.O. 2-1-111
INLET FAN MODULE - - - - -	T.O. 2J-F100-53-6
INLET FAN MODULE - CLEANING - - - - -	WP 201 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of 1st and 2nd stage compressor stator assemblies.

2. FIRST AND SECOND STAGE COMPRESSOR STATOR ASSEMBLIES - INSPECTION.

(See Figure 1.)

- a. Ensure that first and second stage stator assemblies have been cleaned per WP 201 00.
- b. Visually inspect stator assemblies using white light and

3X magnifying glass for surface damage and wear. See figure 1.

- c. Fluorescent penetrant inspect stator assemblies for cracks on a system currently qualified per MIL-STD-1823 at 90 percent probability of detection and 50 percent confidence level to surface length indication of 0.070 inch long. Refer to T.O. 2-1-111, SPOP 82. No cracks allowed.

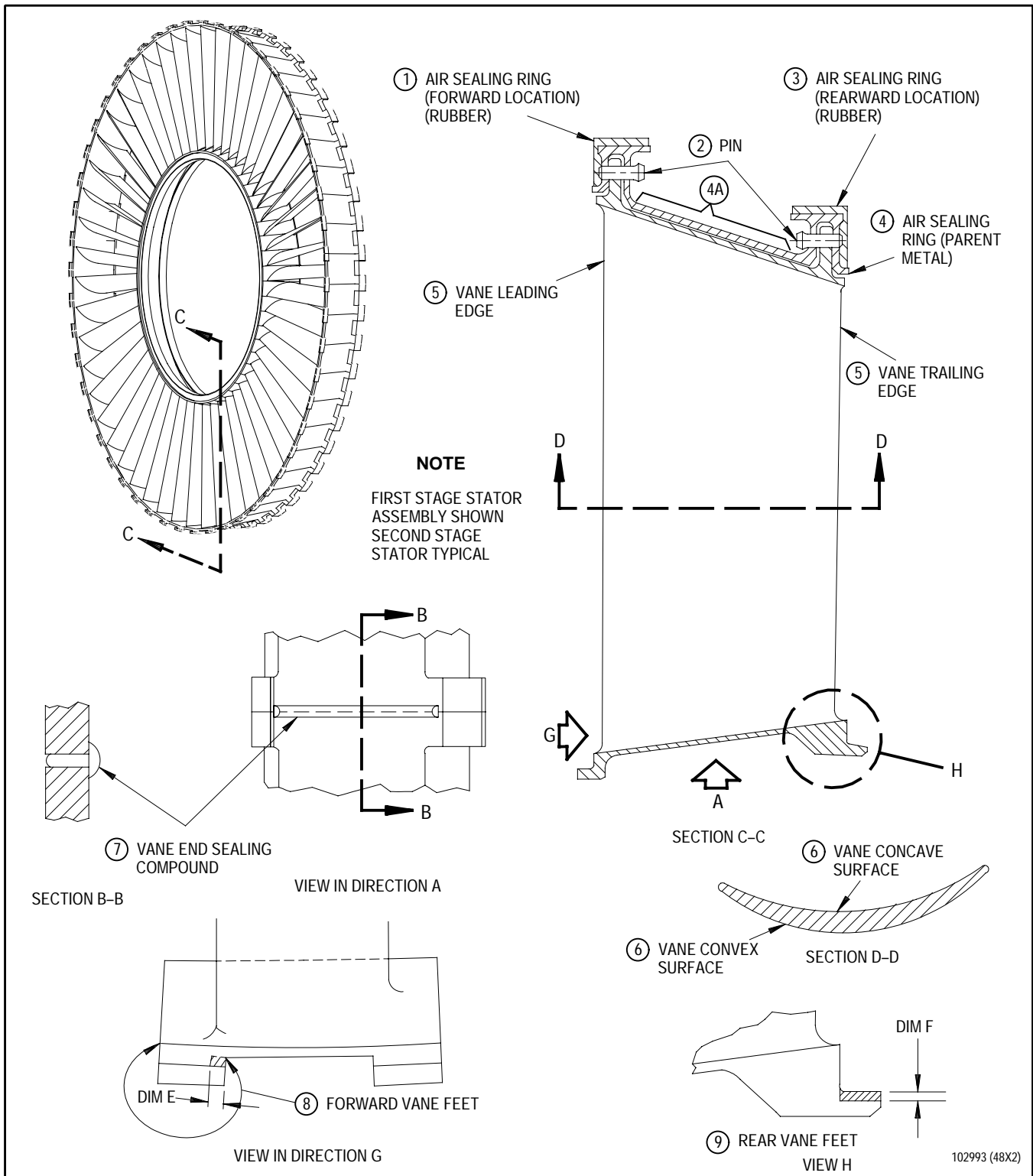


Figure 1. First and Second Stage Compressor Stator Assemblies - Inspection

Legend for figure 1

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Air sealing ring (forward location) (rubber) -			
Grooving or wear	0.350 inch width 1st stage, 0.240 inch width 2nd stage, and 0.045 inch depth over 360 degrees.	Any amount	Repair per WP 418 00.
Damage	a. Shallow damage that does not extend across seal is acceptable. b. Any one area may not be larger than 0.500 inch square. c. Not more than three areas of damage separated by 4 inches of securely bonded rubber is acceptable.	Any amount Up to three areas, each less than 1 inch square, separated by at least 4 inches of securely bonded rubber	Repair per WP 418 00. Local repair rubber per WP 418 00.
Unbonding of rubber from seal ring on forward edge	Not serviceable	Any amount	Repair per WP 418 00.
2. Pin -			
Loose	Not serviceable	Any amount	Repair per WP 418 00.

Legend for figure 1 (continued)

Inspection Area Condition ^b	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Air sealing ring (rearward location) (rubber) -			
Grooving or wear	0.350 inch width 1st stage, 0.240 inch width 2nd stage, and 0.045 inch depth over 360 degrees.	Any amount	Repair per WP 418 00.
	a. Shallow damage that does not extend across seal is acceptable.	Any amount	Repair per WP 418 00.
	Any one area not greater than 1/2 inch by 1/2 inch wide by 1/8 inch deep or equivalent volume.	Up to 3 areas, each less than 1 inch square and separated by a minimum of 4 inches of securely bonded rubber	Local repair rubber per WP 418 00.
	c. Not more than three areas of damage separated by bonded rubber is acceptable.		
4. Air sealing ring assembly (parent metal) -			
Cracks	Not serviceable	Not repairable	Replace compressor stator assembly.
Nicks, dents	Not serviceable	Depth of material removal must not exceed 0.010 inch all over. One nick 0.025 inch deep x 0.150 inch x 0.250 inch allowed in AREA 4A. No nicks allowed within 0.100 inch of radius.	Blend repair per WP 418 00.

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
5. Vane leading and trailing edges - Nicks, dents, bends and cracks.	Not serviceable	<p>a. Repairable if damage can be blend repaired within a maximum depth of 0.125 inch and the blend does not result in material removal within 0.250 inch of the OD or ID platforms.</p> <p>b. Blends on leading and trailing edges shall not be directly opposite and shall be separated diagonally by a minimum distance of 2.760 inches for the first stage and 2.110 inches for the second stage vane (mean chordal lengths).</p> <p>c. Damage in more than three places on any one vane leading or trailing edge is not acceptable.</p> <p>d. Not more than 25% of vanes in any assembly may be blend repaired.</p> <p>e. Vanes over the above limits (a-d) may be replaced.</p>	Blend repair per WP 418 00 or replace vane per WP 418 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
6. Vane convex and concave surfaces -			
Round-bottom dents without cracks	Serviceable with up to 0.005 inch material protrusion on opposite face, and not more than 0.030 inch deep.	Not reparable	Replace vane per WP 418 00.
Cracks	Not serviceable	Not reparable	Replace vane per WP 418 00.
Nicks	Not serviceable	Depth of material removed shall not exceed 0.030 inch. Not more than 25% of vanes in any assembly may be blend repaired.	Blend repair per WP 418 00.
NOTE			
No through voids in sealing compound from ID to OD.			
7. Vane end sealing compound -			
Missing	Voids of 0.500 total linear inch per vane for a maximum of ten vanes. Minor surface imperfections are acceptable.	Any amount	Replace sealing compound per WP 418 00.
8. Forward vane feet -			
Wear resulting in Dimension E on 1st stator only	Up to 0.025 inch maximum for Dimension E	Not reparable	Replace compressor stator assembly.
9. Rear vane feet -			
Wear resulting in Dimension F	0.020 inch	Not reparable	Replace compressor stator assembly.

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL, AIR, COMPRESSOR, FRONT FIRST STAGE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	15	3	15	4	0
2	0			5 - 6	15

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of 1st stage compressor front air seal.

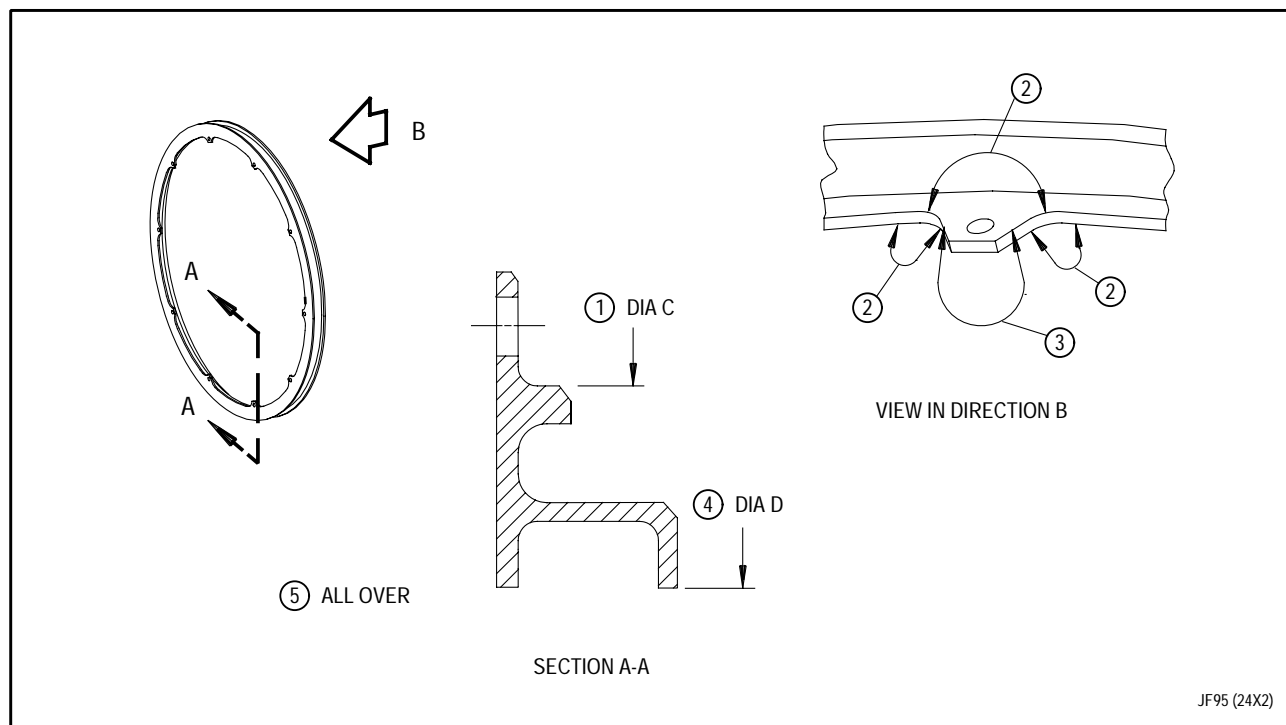
2. FIRST STAGE COMPRESSOR FRONT AIR SEAL - INSPECTION.

(See Figures 1 and 2.)

- a. Ensure that air seal has been cleaned per WP 201 00.
- b. Visually inspect front air seal using white light and 3X

magnifying glass for surface damage and wear. See figure 1.

- c. Fluorescent penetrant inspect air seal for cracks on a system with capability defined in figure 2. Refer to T.O. 2J-F100-9. No cracks allowed. All crack indications observed are cause for rejection and require Material Review Board (MRB) evaluation. (See figure 2.)

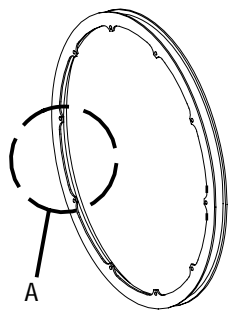


Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Diameter C - Worn, damaged	14.505 inches diameter maximum	Not repairable	Replace air seal.
2. Retainer attachment tang - Nicks and scratches	Not serviceable	See corrective action.	Blend all nicks and scratches. Blend depth shall not exceed 0.005 inch. Replace air seal if damage exceeds blend limits.

Figure 1. First Stage Compressor Front Air Seal - Inspection

Legend for figure 1 (continued)

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
3. Retainer attachment tang -			
Nicks and scratches	Not serviceable	See corrective action.	Blend all nicks and scratches. Blend depth shall not exceed 0.015 inch. Replace air seal if damage exceeds blend limits.
4. Diameter D -			
Wear	15.779 inches diameter minimum	Not repairable	Replace air seal.
5. All over -			
Cracks	Not serviceable	Not repairable	Replace air seal.
Nicks	Not serviceable	See corrective action.	Blend all nicks and scratches. Blend depth shall not exceed 0.005 inch. Replace air seal if damage exceeds blend limits.



NOTE

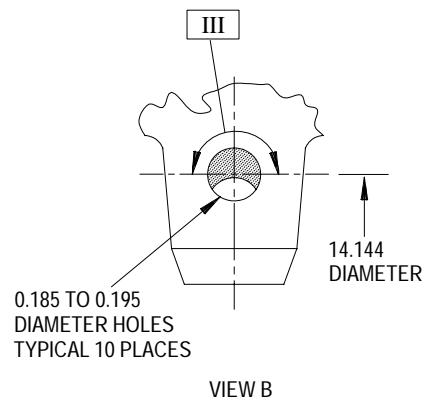
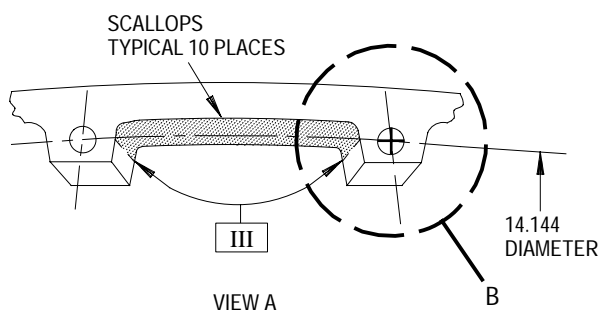
- CRACK INDICATIONS OBSERVED AT INSPECTION ARE REJECTABLE AND REQUIRE MATERIAL REVIEW BOARD EVALUATION
- ALL DIMENSIONS IN INCHES
- FPI SHADED OR INDICATED AREAS ON A SYSTEM CURRENTLY QUALIFIED PER MIL-STD-1823 TO 90% PROBABILITY OF DETECTION AND 50% CONFIDENCE LEVEL TO THE SURFACE LENGTH INDICATION DEFINED BY THE BOX ()

I REQUIRES SYSTEM WITH 0.070 CAPABILITY

II REQUIRES SYSTEM WITH 0.050 CAPABILITY

III REQUIRES SYSTEM WITH 0.040 CAPABILITY

- AREAS NOT DEFINED REQUIRE SYSTEM WITH 0.070 CAPABILITY.



71319 (36X2)

Figure 2. First Stage Compressor Front Air Seal - Required Fluorescent Penetrant System Capability

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL, AIR, COMPRESSOR, FRONT, SECOND STAGE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 6					
					31

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Evaluation System Reliability Assessment - - - - -	MIL-HDBK-1823
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Nondestructive Inspection Procedure - Repetitive - - - - -	SWP 004 09
Seal - Air Compressor, 2nd Stage - - - - -	SWP 121 01
Inlet/Fan Module - Inspection - - - - -	T.O. 2J-F100-53-6
Cleaning - - - - -	WP 201 00
Standard Maintenance Procedures - - - - -	T.O. 2-1-111

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

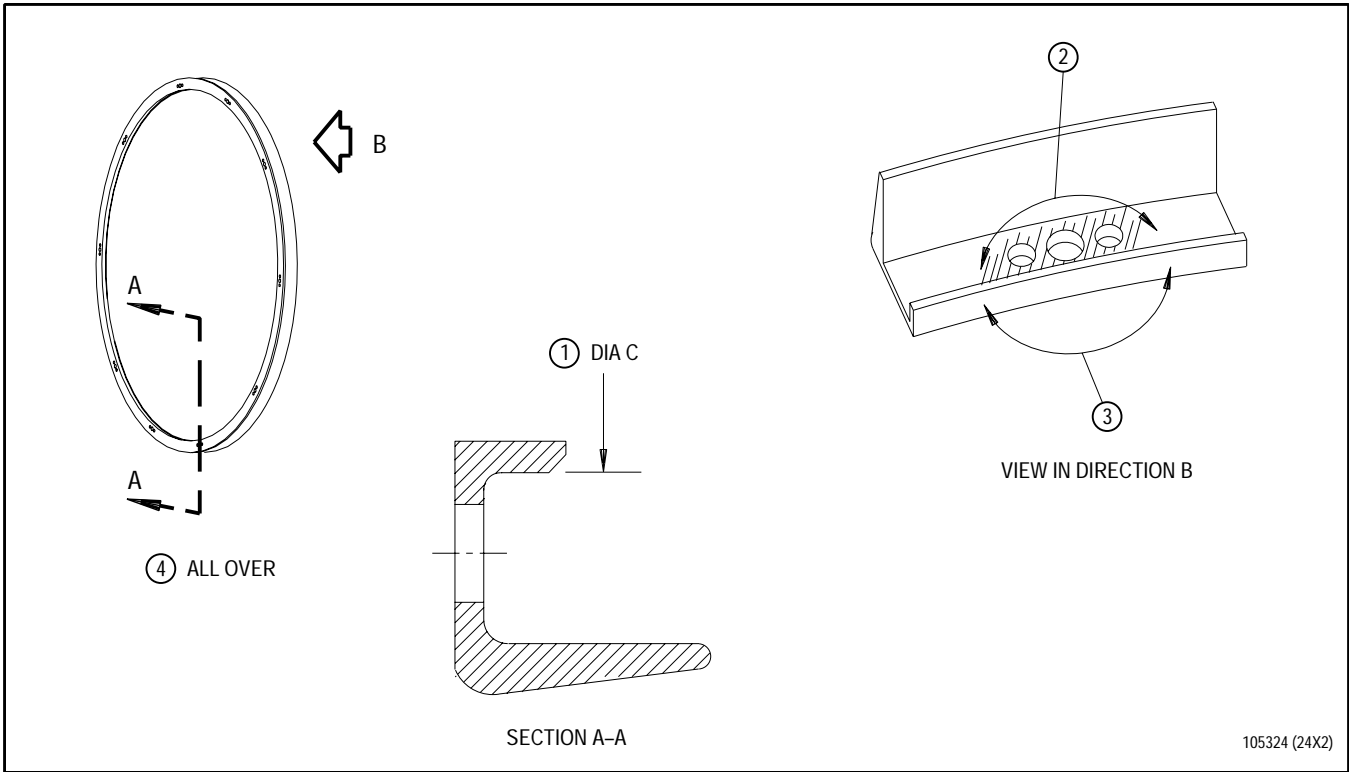
1. INTRODUCTION.

- a. This work package contains instructions for inspection of 2nd stage compressor front air seal using: visual, dimensional, fluorescent penetrant and fully automated eddy current inspection system (ECIS) methods.

2. SECOND STAGE COMPRESSOR FRONT AIR SEAL - INSPECTION.

(See Figures 1 and 2.)

- a. Ensure that air seal has been cleaned per WP 201 00.
- b. Visually inspect air seal using white light and 3X magnifying glass for surface damage and wear. See figure 1.
- c. Fluorescent penetrant inspect 2nd stage compressor front air seal for cracks on a system with capability defined in figure 2. Refer to T.O. 2J-F100-9, SWP 004 03. No cracks allowed.
- d. Eddy current inspect air seal per paragraph 3 and requirements of figure 2.



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Diameter C -			
Worn	18.459 inches diameter minimum	Not reparable	Replace air seal.
Damaged	Not serviceable	Not reparable	Replace air seal.
2 Attachment area -			
Nicks and scratches	Not serviceable	Not reparable	Replace air seal.

Figure 1. Compressor Second Stage Front Air Seal - Inspection

Legend for figure 1 (continued)

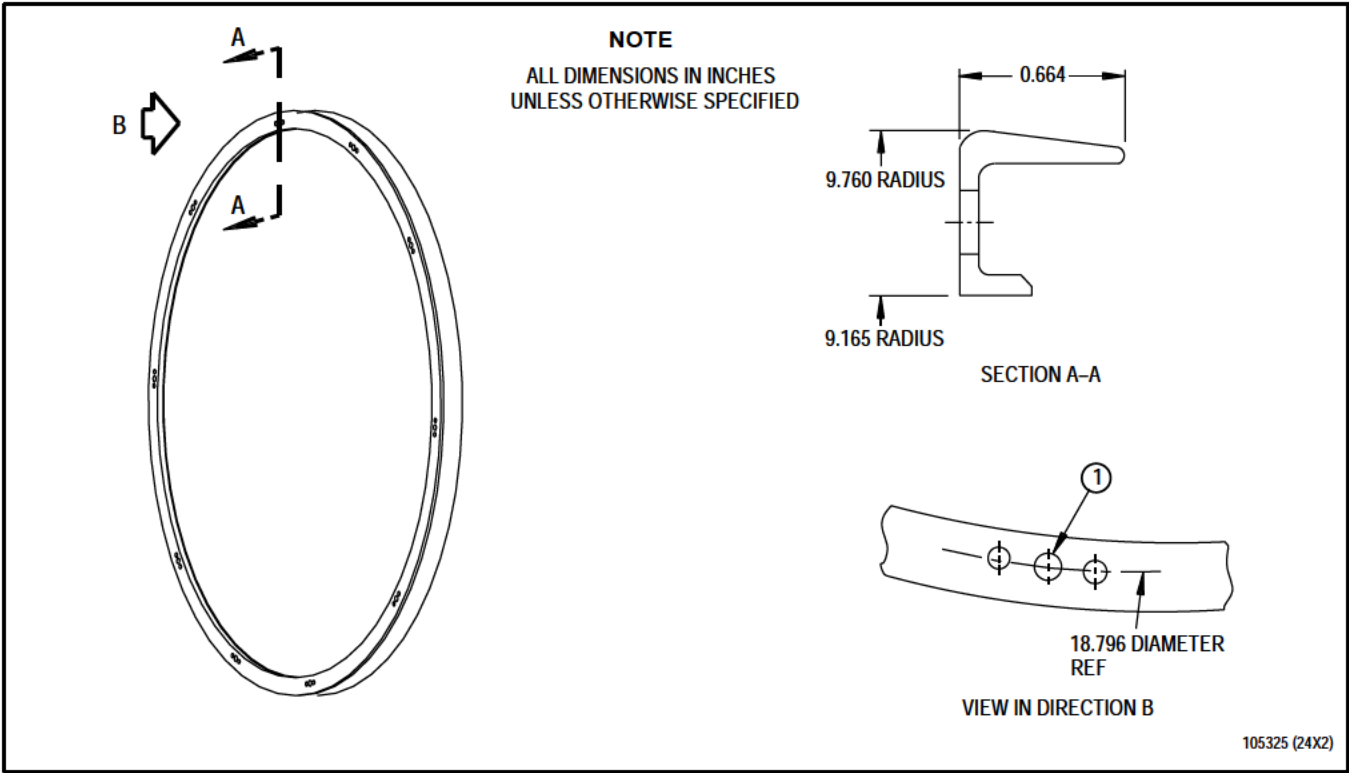
Inspection Area Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
3 Attachment area -			
4 Nicks and scratches	Not serviceable	Not reparable	Replace air seal.
All over			
Cracks	Not serviceable	Not reparable	Replace air seal.
Nicks	Not serviceable	See corrective action.	Blend all nicks and scratches. Blend depth shall not exceed 0.005 inch. Replace air seal if damage exceeds blend limits.

3. EDDY CURRENT INSPECTION USING
PN 112366, FULLY AUTOMATED EDDY CURRENT
INSPECTION STATION VERSION 3 FOR
PN 4083150 BOLTHOLES.

(See Figure 2.)

- a. Ensure that air seal has been
cleaned per WP 201 00.

- b. Prepare ECIS and inspect part.
Refer to T.O. 2J-F100-9,
SWP 004 09 and SWP 121 01.
- c. Evaluate inspection results per
figure 2.



Inspection Area	*Maximum Flaw Depth (Inch)	Flaw Surface Orientation	ECIS System Rejection Limit		Corrective Action
			Threshold (Counts)	(a ₅₀ -inch)	
1. 0.185 to 0.195 inch diameter bolt hole (typical 10 places) -	0.015	Axial	239	0.0122	Replace air seal.

*Eddy current inspect on system in compliance with MIL-HDBK-1823.

Figure 2. Second Stage Compressor Front Air Seal - Eddy Current Inspection

WORK PACKAGE**TECHNICAL PROCEDURES****DISK ASSEMBLY, DRUM ROTOR,
FRONT COMPRESSOR -****INSPECTION****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 20

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	29	5	2	8	26
3	2	6 - 7	29	9	2
4	29			10 - 20	29

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

This work package contains
instructions for inspection of front
compressor drum rotor
disk assembly.

**2. FRONT COMPRESSOR DRUM ROTOR DISK
ASSEMBLY - INSPECTION.**

(See Figures 1 through 3.)

- a. Clean drum rotor disk assembly prior to inspection. Refer to T.O. 2-1-111, SPOP 208, Immersion Method B.
- b. Visually inspect drum rotor assembly using white light and 3X magnifying glass for surface damage and wear per figure 1.



- Do not rework any disk showing presence of cracks or other unusual conditions confirmed by nondestructive inspection or visual examination. Reject disk. Reworking such a disk may result in use of faulty disk causing damage to parts or equipment.
- Use care when using precision instruments used in measuring disk diameters. Lack of care, such as dropping, may cause damage to equipment.

NOTE

Disks with localized damage such as nicks, dents, or scratches may be reworked. If disk has more than localized damage, reject disk.

- c. Inspect drum rotor disk assembly for cracks using fluorescent penetrant method. Refer to T.O. 2-1-111, SPOP 82. Use system with capability defined in figure 2.
- d. Eddy current inspect drum rotor assembly per requirements of figure 3. Refer to T.O. 2J-F100-9.

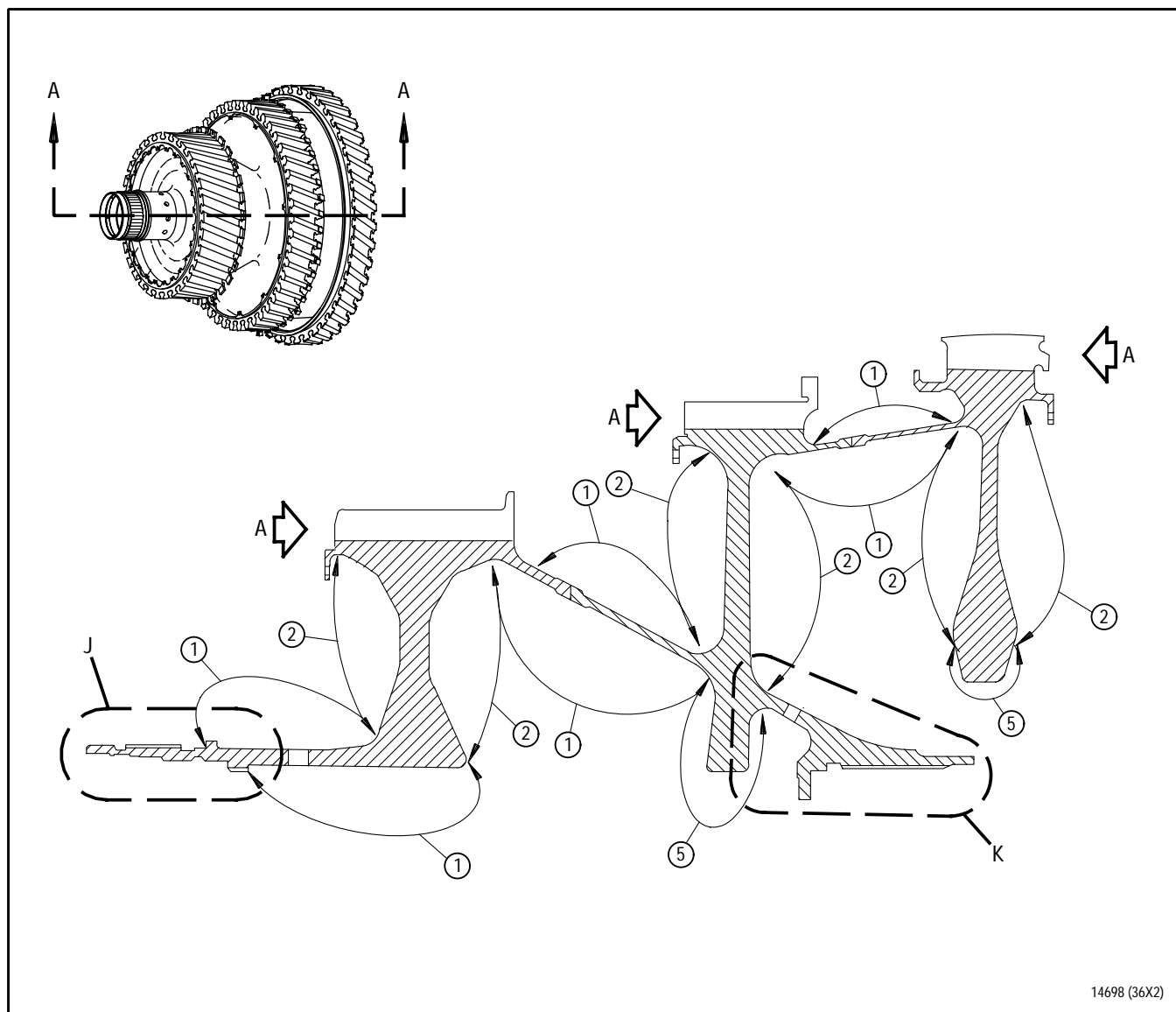
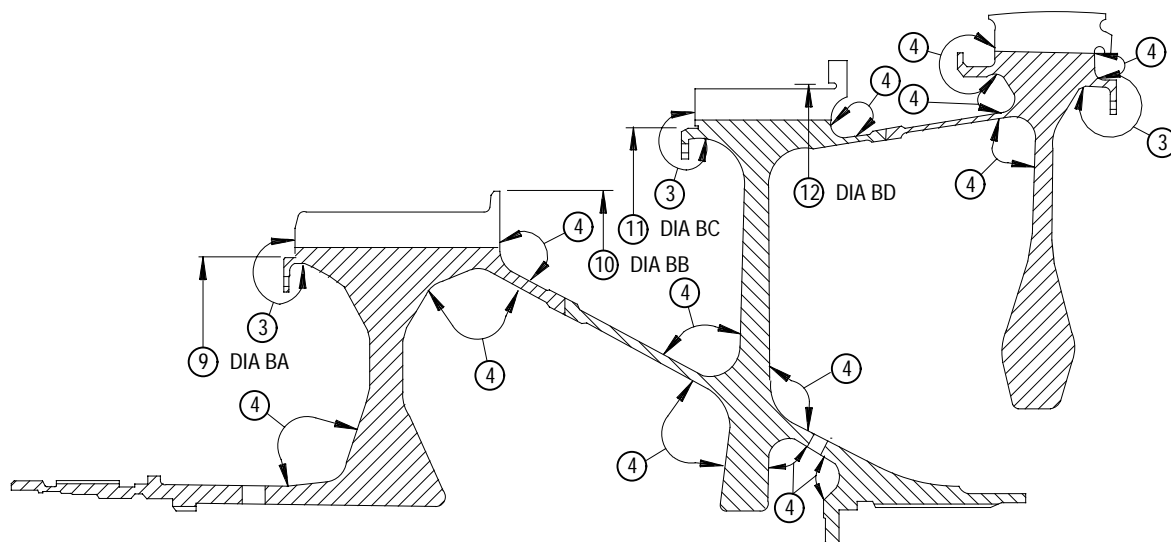


Figure 1. Front Compressor Drum Rotor Disk Assembly - Inspection (Sheet 1 of 5)



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Figure 1. Front Compressor Drum Rotor Disk Assembly - Inspection (Sheet 2 of 5)

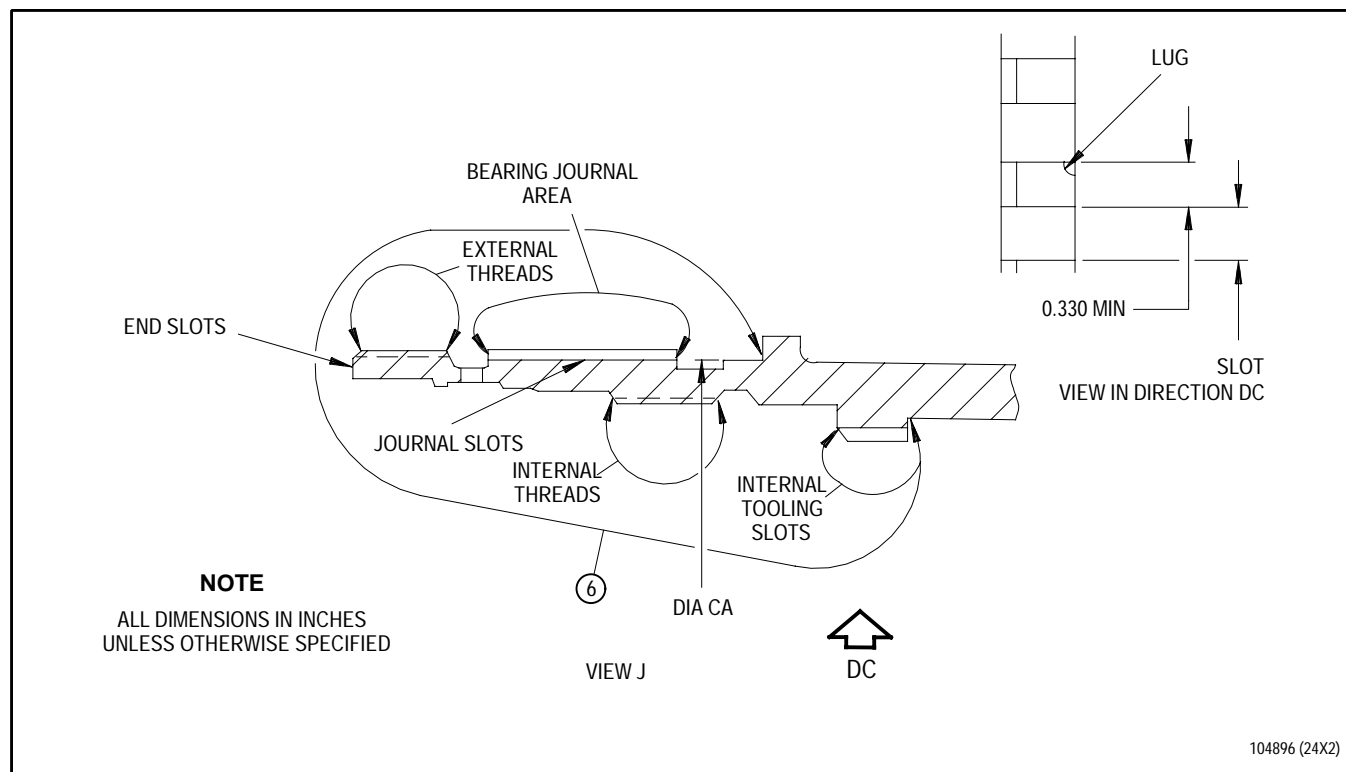
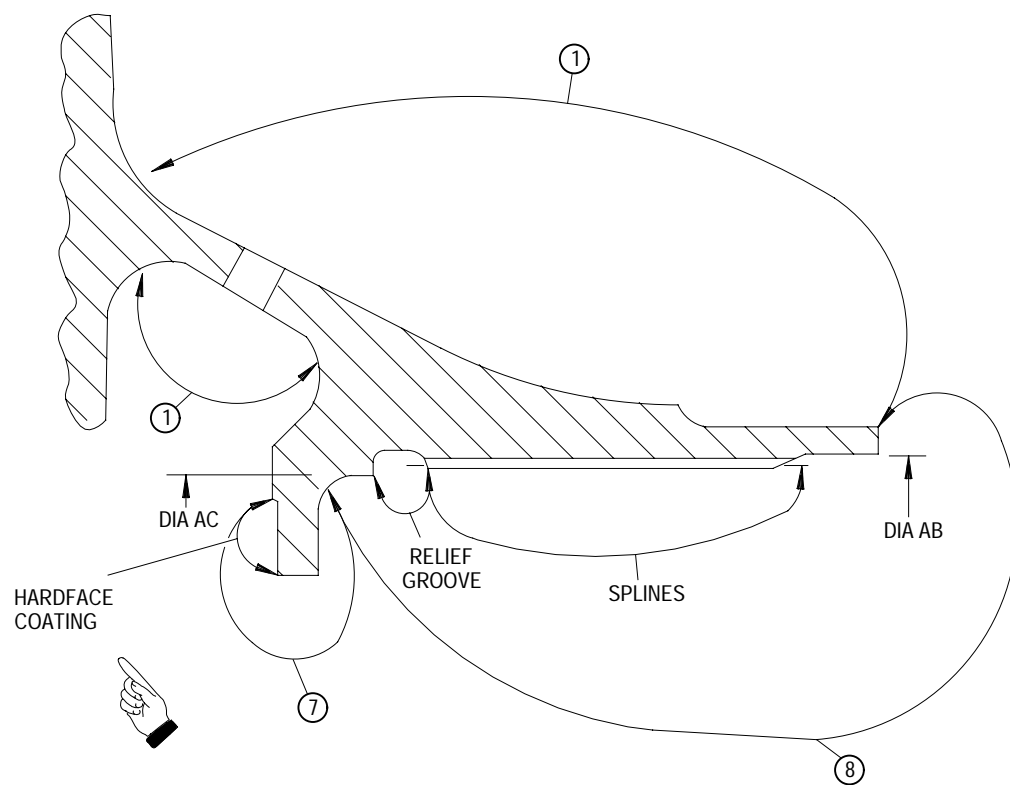


Figure 1. Front Compressor Drum Rotor Disk Assembly - Inspection (Sheet 3 of 5)



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Figure 1. Front Compressor Drum Rotor Disk Assembly - Inspection (Sheet 4 of 5)

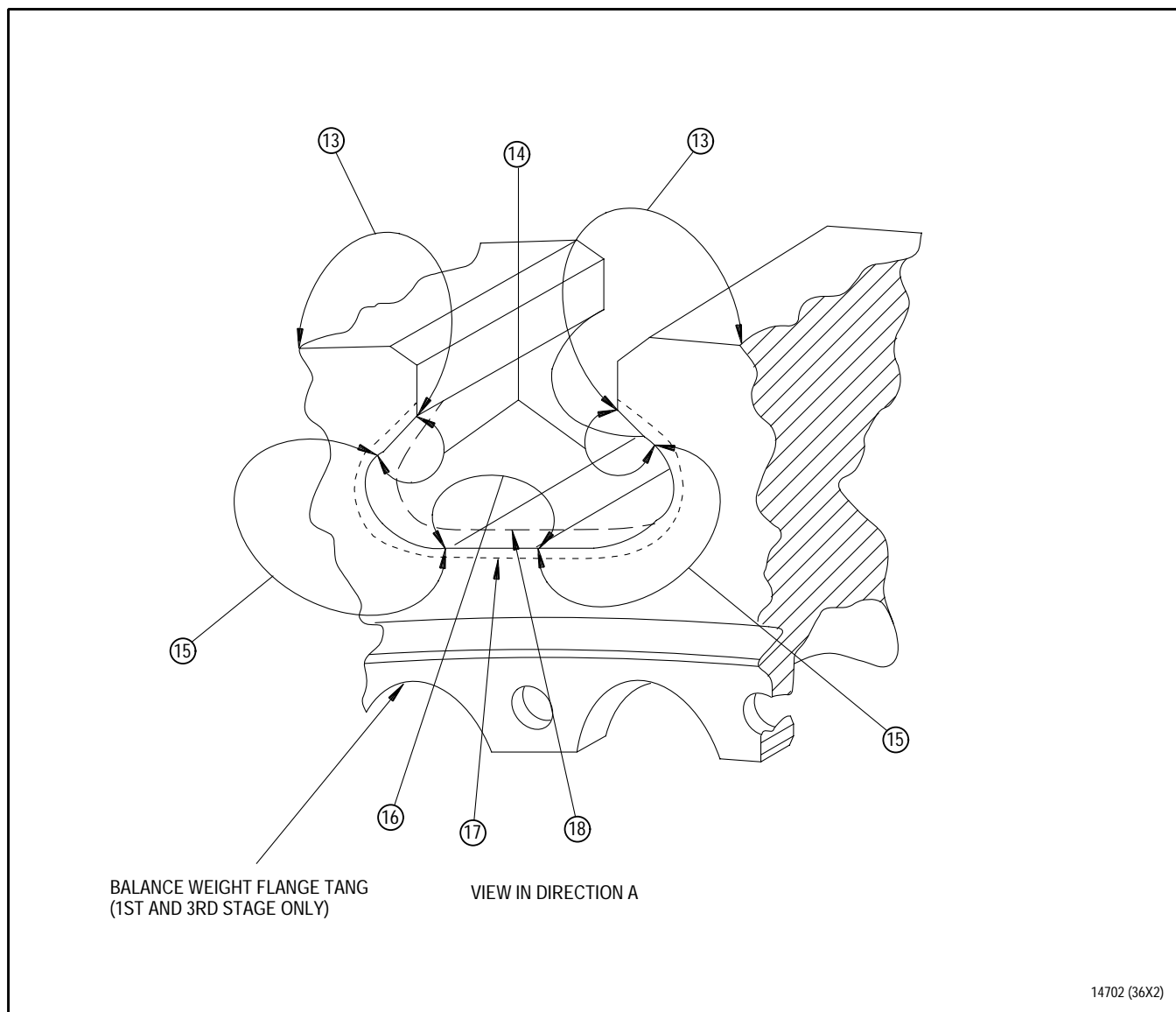


Figure 1. Front Compressor Drum Rotor Disk Assembly - Inspection (Sheet 5 of 5)

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Area not within holes and 0.250 inch of hole -			
Scattered surface damage	0.003 inch deep	0.005 inch deep. Individual repaired areas may be directly opposite one another on OD and ID of rotor, provided that total depth of these repairs do not exceed 0.005 inch.	Blend repair per WP 422 00.
Area within holes and 0.250 inch of hole -			
Scattered surface damage	Not serviceable	Not reparable	Replace drum rotor assembly.
2. Disk webs -			
Scattered surface damage	0.003 inch deep	0.005 inch deep. Individual repaired areas may be directly opposite one another on OD and ID of rotor, provided that total depth of these repairs do not exceed 0.005 inch.	Blend repair per WP 422 00.
3. Flange tang -			
Damage	0.003 inch deep, except no damage allowed within 0.125 inch of blade slots	0.005 inch deep. Individual repaired areas may be directly opposite one another on OD and ID of rotor, provided that total depth of these repairs do not exceed 0.005 inch.	Blend repair per WP 422 00.
Bent, cracked	Not serviceable	Not reparable	Replace drum rotor assembly.

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
4. Scattered surface damage -	Not serviceable	Not reparable	Replace drum rotor assembly.
5. Scattered surface damage -			
2nd Stage	0.003 inch deep. Allowable to peen per WP 422 00	Not reparable	No blend allowed. Replace drum rotor assembly.
3rd Stage	0.003 inch deep. Allowable to peen per WP 422 00	0.005 inch deep	Blend repair per WP 422 00. Shotpeen per WP 422 00.
6. Splines (12 Internal tooling slots) -			
Damaged or cracked lugs	0.040 inch depth. Blend damage to remove sharp edges. No cracks allowed	a. Undamaged lug between slots to be 0.330 inch minimum b. A maximum of six lugs (no two adjacent) may be completely removed if damage causes lug width to be machined less than 0.330 inch	Reoperate all 12 slots per WP 422 00. Remove material between slots per WP 422 00.
Raised metal and/or sharp edges	Not serviceable	Not reparable	Replace drum rotor assembly.
Cracked wall	Not serviceable	Not reparable	Replace drum rotor assembly.
6. DIAMETER CA -			
Wear	3.9465 inches diameter minimum	Minimum diameter 3.9430 inches	Repair drum rotor assembly per WP 422 00.
Circumferential scoring of seal seat mating area	0.010 inch depth 0.250 inch width May be an individual or accumulating total of depth and width.	Minimum diameter 3.9430 inches	Repair drum rotor assembly per WP 422 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
6. Bearing journal area -			
Wear	3.9415 inches diameter minimum	3.9380 inches minimum diameter	Repair drum rotor assembly per WP 422 00.
Axial scoring along entire length of journal	0.010 inch depth 0.250 inch width May be an individual or accumulating total of depth and width.	3.9380 inches minimum diameter	Repair drum rotor assembly per WP 422 00.
Scoring and/ or galling (Non-axial)	0.015 inch depth provided not more than 15% of area is affected	3.9380 inches minimum diameter	Repair drum rotor assembly per WP 422 00.
Ridges and metal pickup	Not serviceable	See corrective action	Blend repair to remove raised edges and metal pickup per WP 422 00.
6. End slots - Damaged or cracked wall	Not serviceable	See corrective action	Reoperate slots per WP 422 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
6. Journal slots - Damaged	0.003 inch deep	0.005 inch deep. Individual repaired areas may be directly opposite one another on OD and ID of rotor, provided that total depth of these repairs do not exceed 0.005 inch	Blend repair per WP 422 00.
Cracked wall	Not serviceable	Not reparable	Replace drum rotor assembly.
6. External, internal threads - Damage	Not serviceable	High metal and thread metal pickup. See corrective action	Blend repair per WP 422 00. Remove thread pickup and high metal. Total removal of entrance thread permissible. Cumulative of damage on other threads shall not exceed 1/2 of one complete thread.
6. Other than slots and threads - Damage	0.002 inch deep	0.004 inch deep	Blend repair per WP 422 00.
7. Hardface coating - Chipping, spalling	Not serviceable	Not reparable	Replace drum rotor assembly.
7. Scattered surface damage (other than hardface coating) -	0.003 inch deep. No high spots or sharp edges allowed	See corrective action	Remove high spots and sharp edges by blending per WP 422 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
8. Splines - Damage	Not serviceable	0.005 inch deep. Individual repaired areas may be directly opposite one another on OD and ID of rotor, provided that total depth of these repairs do not exceed 0.005 inch	Blend repair per WP 422 00.
8. Other than splines - Damage	0.002 inch deep	0.004 inch deep	Blend repair per WP 422 00.
8. DIAMETER AC - Damage, wear	3.810 inches diameter maximum, 3.808 inches diameter minimum	Not reparable	Replace drum rotor assembly.
8. DIAMETER AB - Damage, wear	4.0890 inches diameter maximum, 4.0870 inches diameter minimum	Not reparable	Replace drum rotor assembly.
8. Relief groove - Damage	0.003 inch deep	Not reparable	Replace drum rotor assembly.
9. DIAMETER BA -	11.983 inch diameter minimum	Not reparable	Replace drum rotor assembly.
10. DIAMETER BB -	14.516 inch diameter minimum	Not reparable	Replace drum rotor assembly.
11. DIAMETER BC -	16.875 inch diameter minimum	Not reparable	Replace drum rotor assembly.
12. DIAMETER BD -	18.453 inch diameter maximum	Not reparable	Replace drum rotor assembly.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
13. Blade root area, upper disk lug - Nicks, dents, scratches	Not serviceable	0.020 inch deep, except 0.010 inch deep within 0.125 inch from fore and aft faces.	Blend repair per WP 422 00.
Cracks	Not serviceable	Not reparable	Replace drum rotor assembly.
14. Blade root area, blade pressure face - Galling	Not serviceable (Any amount)	0.003 inch maximum. See corrective action	No blend. All indications shall be shotpeened per WP 422 00, complete coverage required.
Pits, nicks, dents, scratches	Not serviceable (Any amount)	0.003 inch deep	Repair drum rotor assembly. Shotpeen areas per WP 422 00. No blend.
Cracks	Not serviceable	Not reparable	Replace drum rotor assembly.
Wear	Not serviceable	Not reparable	Replace drum rotor assembly.
15. Blade root area, lower slot radius - Any damage	Not serviceable	Not reparable	Replace drum rotor assembly.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
16. Blade root area - lower slot mismatch -			
Nicks, dents, scratches	Not serviceable	0.005 inch deep. No blending allowed within 0.125 inch of edge of fore and aft faces	Blend repair per WP 422 00.
Cracks	Not serviceable	Not repairable	Replace drum rotor assembly.
Pitting	Not serviceable	Not repairable	Replace drum rotor assembly.
17. Forward and rear faces within 0.040 inch minimum of broach slot edge as shown -			
Pits, nicks, dents, or scratches	Not serviceable	Not repairable	Replace drum rotor assembly.
18. Blade root area (broach slot forward and rear end within 0.125 inch of broach slot edge) -			
Machining marks, steps, irregularities and discontinuities	Not serviceable	Not repairable	Replace drum rotor assembly.

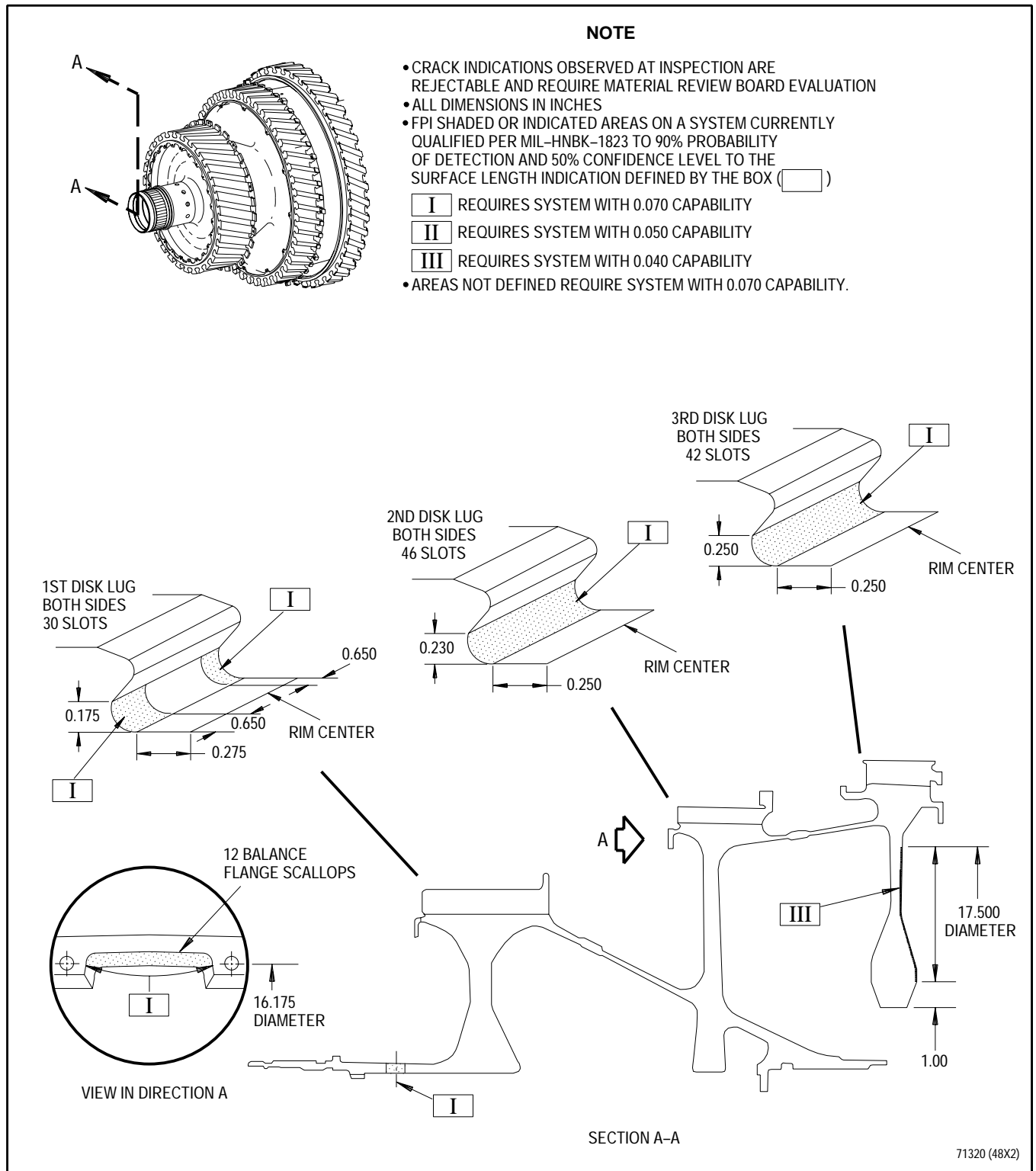


Figure 2. Front Compressor Drum Rotor Disk Assembly - Required Fluorescent Penetrant System Capability

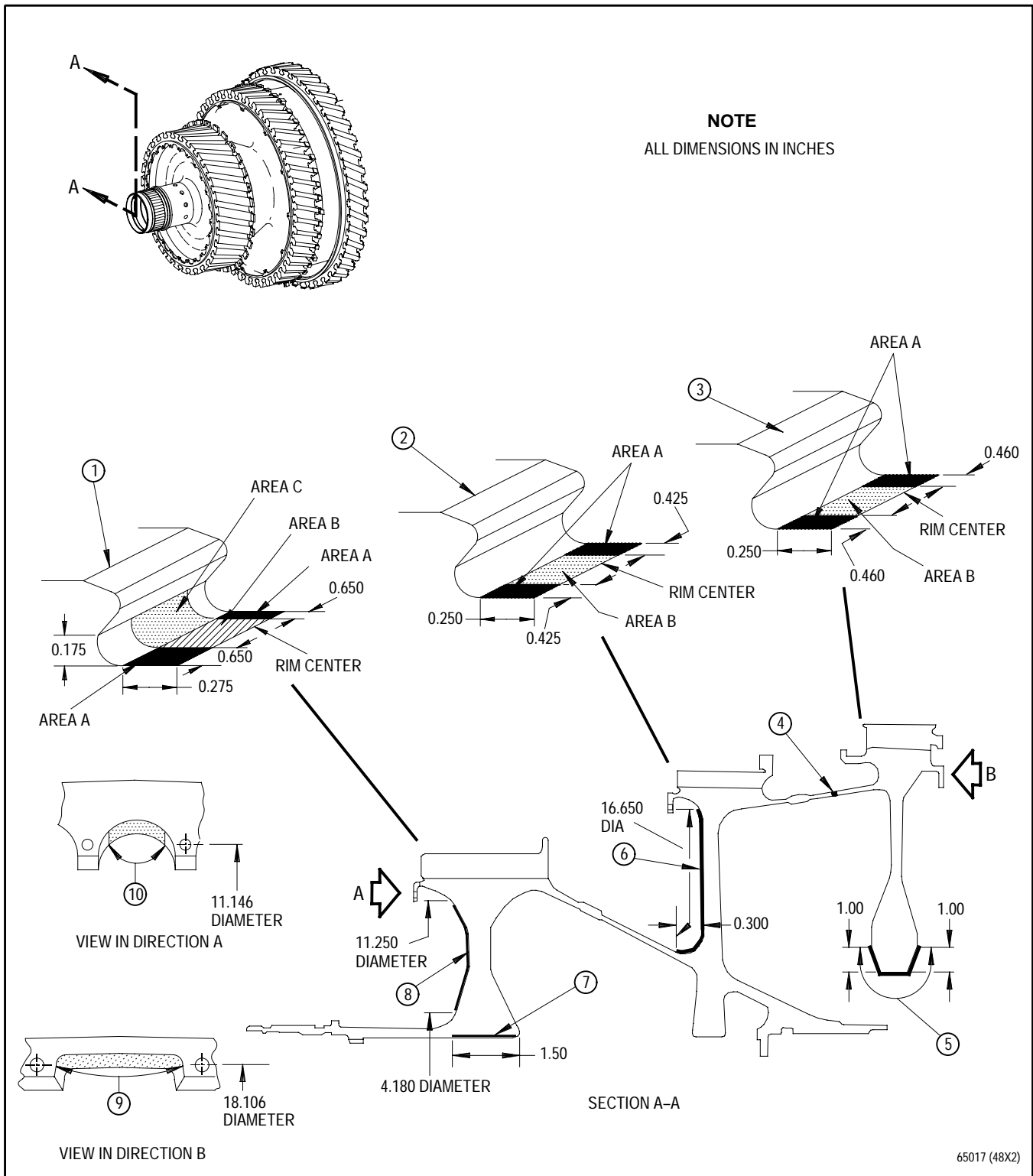


Figure 3. Front Compressor Drum Rotor Disk Assembly - Eddy Current Inspection

Legend for figure 3

Inspection Area	*Maximum Flaw Depth (Inch)	Flaw Surface Orientation	SRL System Rejection Limit		Corrective Action
			(Counts)	(A50-inch)	
1. First disk lug, both sides, 30 slots-					
Area A	0.010	Axial	TBD	TBD	Replace drum rotor.
Area B	0.015	Axial	TBD	TBD	Replace drum rotor.
Area C	0.010	Axial	TBD	TBD	Replace drum rotor.
2. Second disk lug, both sides, 46 slots -					
Area A	0.008	Axial	TBD	TBD	Replace drum rotor.
Area B	0.015	Axial	TBD	TBD	Replace drum rotor.
3. Third disk lug, both sides, 42 slots -					
Area A	0.010	Axial	TBD	TBD	Replace drum rotor.
Area B	0.015	Axial	TBD	TBD	Replace drum rotor.
4. Oil drain holes, 2 places -	0.015	Radial	TBD	TBD	Replace drum rotor.
5. Third disk ID area -	0.008	Axial Radial	TBD	TBD	Replace drum rotor.

*Eddy current inspect on system currently qualified per MIL-STD-1823 at 90% probability of detection and 50% confidence level for required flaw depth.

Legend for figure 3 (continued)

	Inspection Area	*Maximum Flaw Depth (Inch)	Flaw Surface Orientation	SRL System Rejection Limit		Corrective Action
				(Counts)	(A50-inch)	
6.	Second disk front web -	0.015	Circumferential Radial	TBD	TBD	Replace drum rotor.
7.	First disk ID -	0.010	Axial	TBD	TBD	Replace drum rotor.
8.	First disk front web -	0.015	Circumferential Radial	TBD	TBD	Replace drum rotor.
9.	Third disk balance flange scallops, 30 places -	0.015	Axial	TBD	TBD	Replace drum rotor.
10.	First disk balance flange scallops, 24 places -	0.010	Axial	TBD	TBD	Replace drum rotor.

*Eddy current inspect on system currently qualified per MIL-STD-1823 at 90% probability of detection and 50% confidence level for required flaw depth.

WORK PACKAGE

TECHNICAL PROCEDURES

BRACKET, LOWER FRONT, UPPER FRONT, ENGINE DIAGNOSTIC UNIT -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	15	3	15	4	0
2	1				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

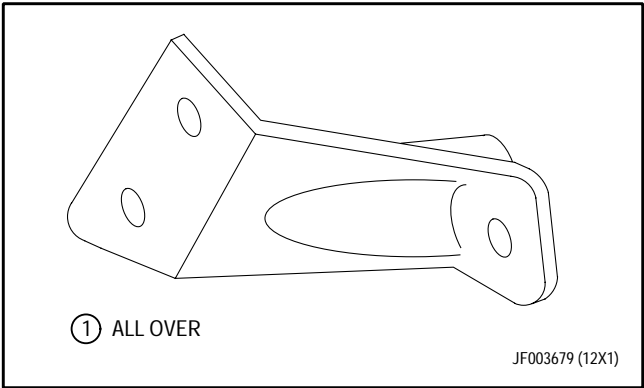
- a. This work package contains instructions for inspection of engine diagnostic unit upper and lower front brackets.

2. ENGINE DIAGNOSTIC UNIT UPPER AND LOWER FRONT BRACKETS - INSPECTION.

(See Figures 1 and 2.)

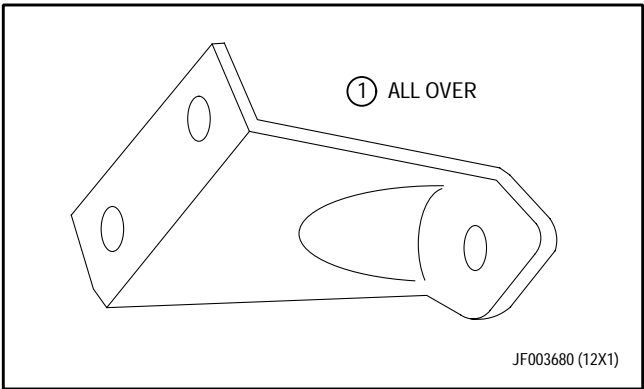
- a. Ensure that brackets have been cleaned per WP 201 00.

- al. Fluorescent penetrant inspect brackets for cracks. Refer to T.O. 2J-F100-9. No cracks allowed.
- b. Visually inspect brackets using white light and 3X magnifying glass for surface damage and wear. See figures 1 and 2.



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All over - Damage, cracks or wear	Not serviceable	Not reparable	Replace bracket.

Figure 1. Engine Diagnostic Unit Lower Front Bracket - Inspection



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All over - Damage, cracks or wear	Not serviceable	Not reparable	Replace bracket.

Figure 2. Engine Diagnostic Unit Upper Front Bracket - Inspection

WORK PACKAGE**TECHNICAL PROCEDURES****CASE ASSEMBLY, FAN -****INSPECTION****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	26	3	26	6 Added	25
2	0	4	25	7 Added	26
2A Added	26	5	26	8 Blank Added	26
2B Blank Added	26				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of fan case assembly.

2. FAN CASE ASSEMBLY - INSPECTION.

(See Figure 1.)

- a. Ensure that fan case assembly has been cleaned per WP 201 00.
- b. Visually inspect fan case assembly using white light and 3X magnifying glass for surface damage and wear. See figure 1.
- c. Fluorescent penetrant inspect fan case assembly for cracks on a system currently qualified per MIL-STD-1823 at 90% probability of detection and 50% confidence level to surface length indication of 0.070 inch long. Refer to T.O. 2J-F100-9. No cracks allowed.

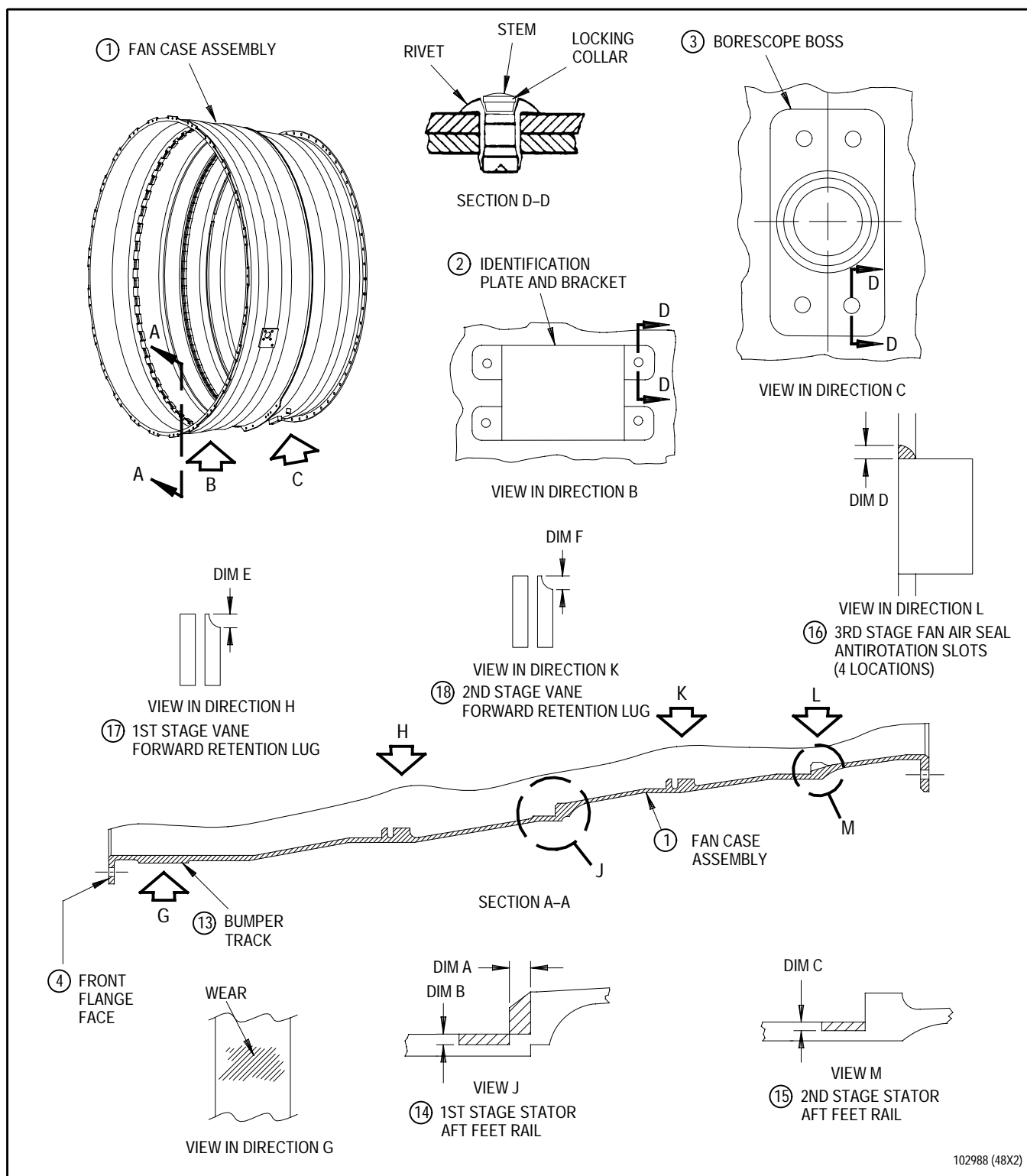
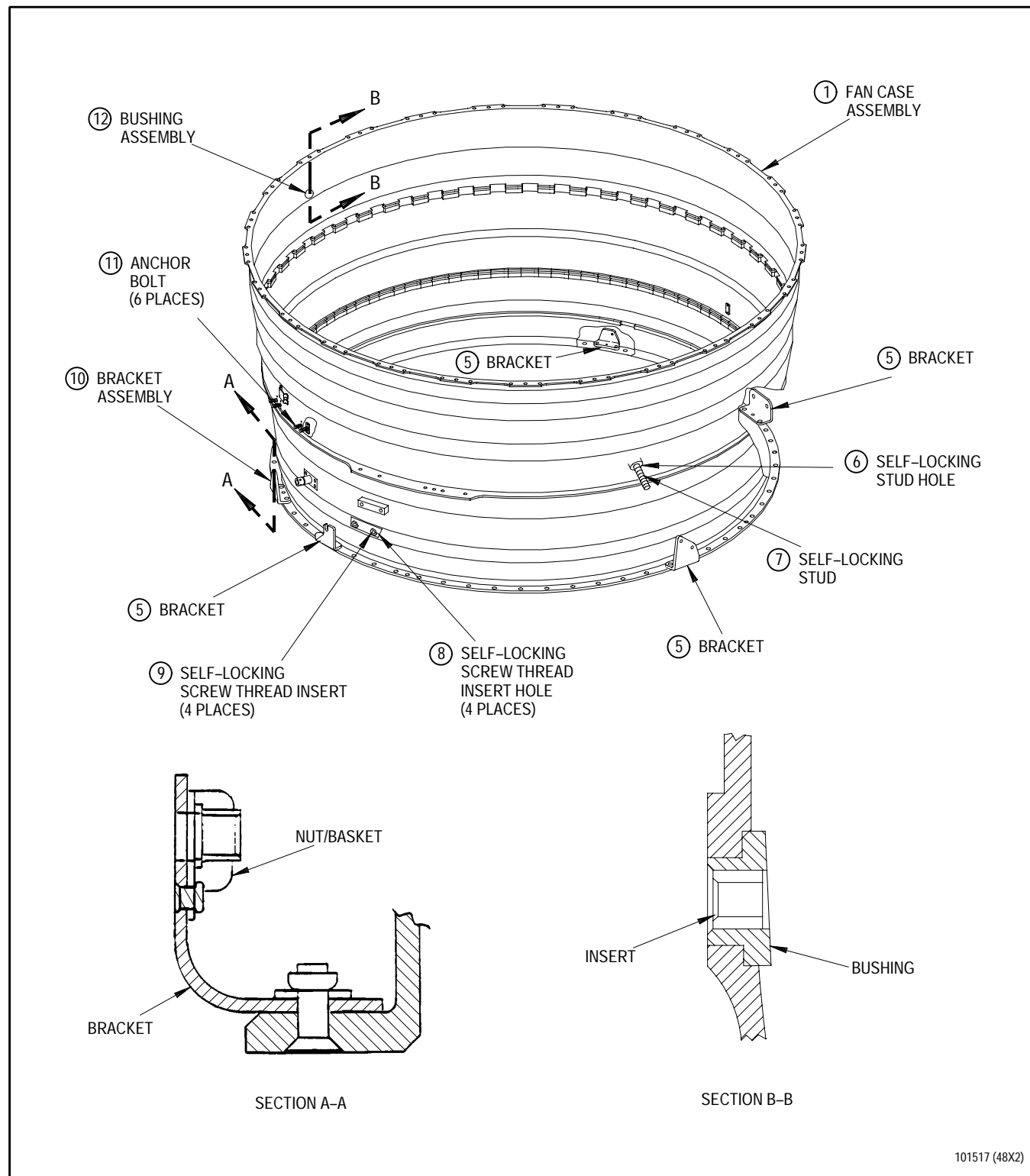


Figure 1. Fan Case Assembly - Inspection (Sheet 1 of 2)



101517 (48X2)

Figure 1. Fan Case Assembly - Inspection (Sheet 2 of 2)

Legend for figure 1

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Fan case assembly -			
Cracks	Not serviceable	Not reparable	Replace fan case.
Impact damage, nicks, dents	Well-rounded injuries to depth of 0.025 inch are serviceable.	Blend repair to depth of 0.025 inch.	Blend repair per WP 424 00.
2. Identification plate and bracket -			
Missing, damaged	Not serviceable	See corrective action.	Replace identification plate and/or bracket per WP 424 00.
NOTE			
Identification plate is not a detail of fan case, and should be transferred from unreparable case to new case.			
Broken/missing rivets, collars, stems	Not serviceable	See corrective action.	Replace rivets per WP 424 00.
3. Borescope boss -			
Broken/missing rivets, collars or stems	Not serviceable	Not reparable	Replace rivets per WP 424 00.
Missing self-locking screw thread insert	Not serviceable	Not reparable	Replace insert per WP 424 00.
Self-locking insert threads damaged	Not serviceable	Not reparable	Replace insert per WP 424 00.
Boss insert threads stripped or damaged	Not serviceable	Not reparable	Replace boss per WP 424 00.
4. Front flange face -	Not serviceable	See corrective action.	Plasma spray repair per WP 424 00.
5. Bracket -			
Cracks	Not serviceable	Not reparable	Replace bracket per WP 424 00.

Legend for figure 1 (continued)

Inspection Area Condition		Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
6.	Self-locking stud hole -			
	Stripped or damaged threads	Not serviceable	Not repairable	Replace compressor case set.
7.	Self-locking stud -			
	Missing	Not serviceable	Not repairable	Replace stud per WP 424 00.
	Damaged	Not serviceable	Not repairable	Replace stud per WP 424 00.
8.	Self-locking screw thread insert hole -			
	Stripped or damaged threads	Not serviceable	Not repairable	Replace compressor case set.
9.	Self-locking screw thread insert -			
	Missing	Not serviceable	Not repairable	Replace insert per WP 424 00.
	Stripped or damaged	Not serviceable	Not repairable	Replace insert per WP 424 00.
10.	Bracket assembly -			
	Bracket cracks	Not serviceable	Not repairable	Replace bracket per WP 424 00.
	Nut/Basket damaged (self-locking threads stripped or damaged)	Not serviceable	Not repairable	Replace nut per WP 424 00.
11.	Anchor bolt -			
	Damaged	Not serviceable	Not repairable	Replace bolt per WP 424 00.
12.	Bushing assembly -			
	Insert missing or damaged	Not serviceable	Not repairable	Replace insert per WP 424 00.
	Bushing insert threads damaged	Not serviceable	Not repairable	Replace bushing assembly per WP 424 00.

Legend for figure 1 (continued)

Inspection Area - Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
13. Bumper track - Wear	0.010 inch at all 23 locations	Not reparable	Replace fan case.
14. 1st stage stator aft feet rail - Wear resulting in Dimension A	0.015 inch	Not reparable	Replace fan case.
Wear resulting in Dimension B	0.010 inch	Not reparable	Replace fan case.
15. 2nd stage stator aft feet rail - Wear resulting in Dimension C	0.010 inch	Not reparable	Replace fan case.
16. 3rd stage fan air seal antirotation slots - Wear resulting in Dimension D (4 locations)	0.050 inch	Not reparable	Replace fan case.
17. 1st stage vane forward retention lug - Wear resulting in Dimension E	0.040 inch	Not reparable	Replace fan case.
18. 2nd stage vane forward retention lug - Wear resulting in Dimension F	0.040 inch	Not reparable	Replace fan case.

WORK PACKAGE

TECHNICAL PROCEDURES

SUPPORT, FRONT COMPRESSOR STATOR, BELL CRANK, INLET -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4					0

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

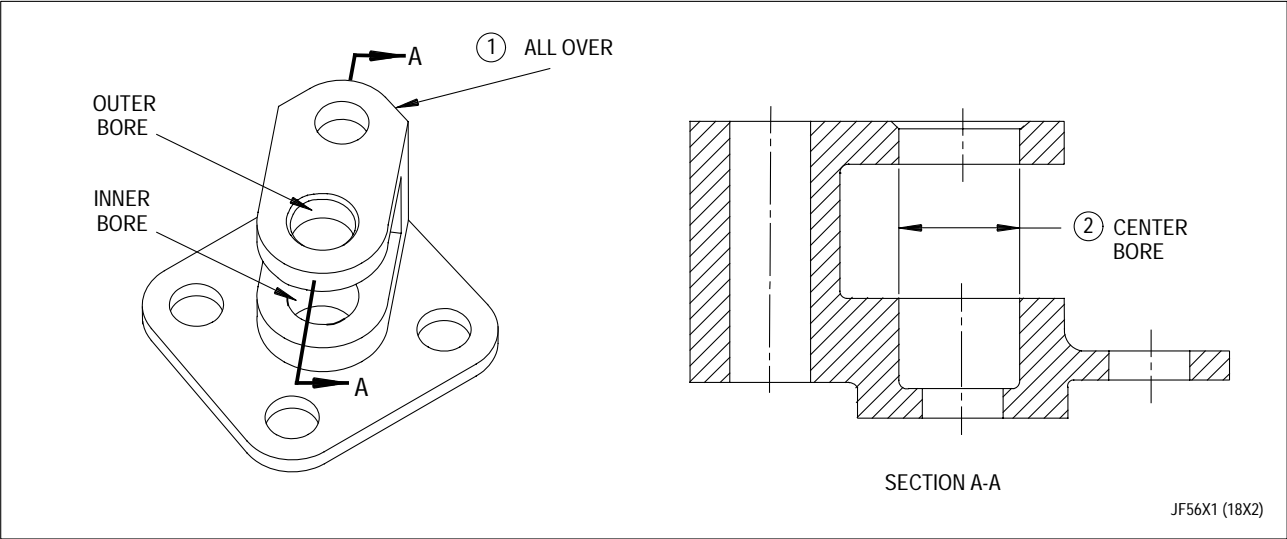
1. INTRODUCTION.

- a. This work package contains instructions for inspection of inlet front compressor stator bellcrank support.

**2. FRONT COMPRESSOR STATOR
BELLCRANK SUPPORT - INSPECTION.**

(See Figure 1.)

- a. Inspect bellcrank for cracks using fluorescent penetrant method. Refer to T.O. 2J-F100-9. No cracks allowed.
- b. Visually inspect bellcrank using white light and 3X magnifying glass for surface damage and wear. See figure 1.



Inspection Area - Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All over -			
Cracks	Not serviceable	Not reparable	Replace support.
2. Center bores -			
Wear	0.385 inch diameter maximum	0.440 inch diameter maximum	Sleeve repair per WP 425 00.

Figure 1. Inlet Front Compressor Stator Bell Crank Support - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

CONNECTING LINK, RIGID, FRONT COMPRESSOR STATOR AND CONNECTING LINK,
COMPRESSOR STATOR, INLET -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	15	3	15	4	0
2	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

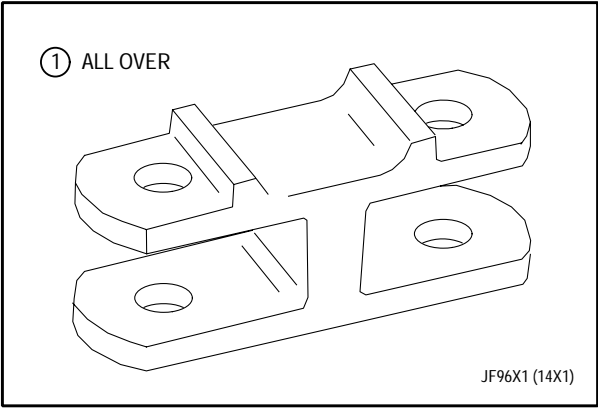
- a. This work package contains instructions for inspection of front compressor stator rigid connecting link and inlet compressor stator connecting link.

**2. FRONT COMPRESSOR STATOR RIGID
CONNECTING LINK AND INLET COMPRESSOR
STATOR CONNECTING LINK - INSPECTION.**

(See Figures 1 and 2.)

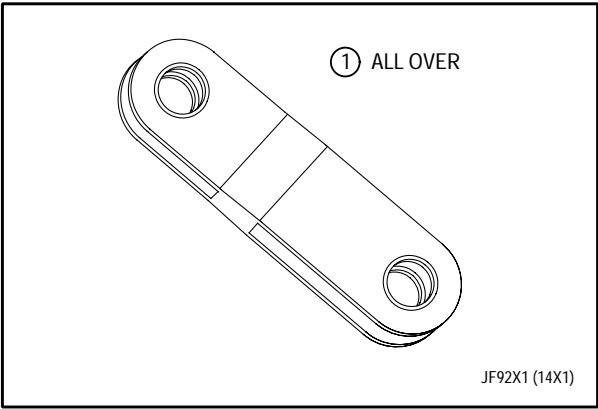
- a. Ensure that connecting links have been cleaned per WP 201 00.

- a1. Inspect connecting links for cracks using fluorescent penetrant method. Refer to T.O. 2J-F100-9. No cracks allowed.
- b. Visually inspect connecting links using white light and 3X magnifying glass for surface damage and wear. See figures 1 and 2.



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All over - Cracks	Not serviceable	Not reparable	Replace link.

Figure 1. Front Compressor Stator Rigid Connecting Link - Inspection



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All over - Cracks	Not serviceable	Not reparable	Replace link.

Figure 2. Inlet Compressor Stator Connecting Link - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

BELL CRANK ASSEMBLY, FRONT COMPRESSOR STATOR LINKAGE, INLET -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	30	5 Added	22	6 Blank Added	22
3 - 4	22				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

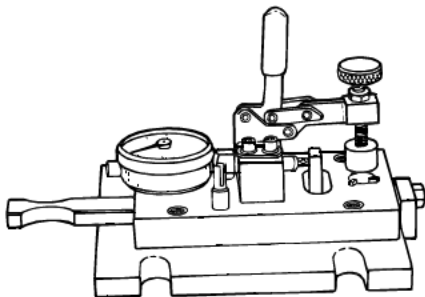
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2	INLET FRONT COMPRESSOR STATOR LINKAGE BELL CRANK ASSEMBLY AND HEADLESS SHOULDER PIN - INSPECTION	
	GAGE -- UNIBALL BEARING, RADIAL WEAR - - - - -	SAALC 8222931

ILLUSTRATED SUPPORT EQUIPMENT



SAALC 8222931 -C

Figure T1. SAALC 8222931 GAGE

1. INTRODUCTION.

- a. This work package contains instructions for inspection of inlet front compressor stator bell crank linkage assembly and headless shoulder pin.

- (4) Zero gage dial indicator.
- (5) Pull gage slide outboard until it stops and hold.
- (6) Read dial gage indicator for bearing radial wear.

2. INLET FRONT COMPRESSOR STATOR BELL CRANK LINKAGE ASSEMBLY - INSPECTION

(See Figure 1.)

- a. Ensure that linkage arm has been cleaned per WP 201 00.
- b. Inspect linkage arm(2) for cracks using fluorescent penetrant method. Refer to T.O. 2-1-111, SPOP 82. No cracks allowed.
- c. Visually inspect linkage arm using white light and 3X magnifying glass for surface damage and wear. See figure 1.
- d. Dimensionally inspect linkage arm per figure 1.
- e. Check bearing(1) radial wear as follows:
 - (1) Swing clamp of SAALC 8222931 gage out of position.
 - (2) Install linkage arm in gage with bearing ID held by locating pin.
 - (3) Apply inboard pressure against linkage arm to remove radial play between bearing and bearing housing. Hold bearing housing with gage clamp.

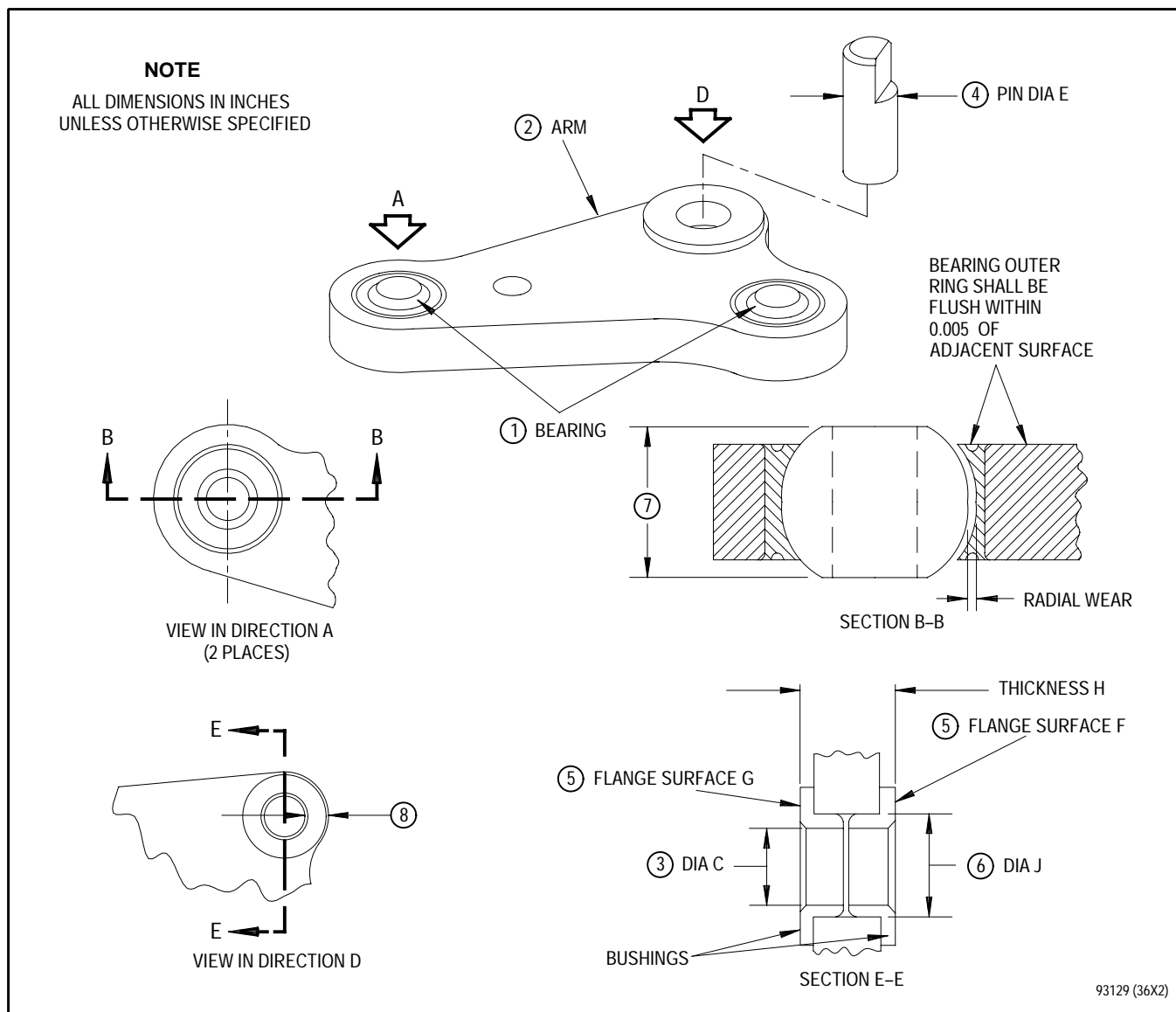


Figure 1. Inlet Front Compressor Stator Bell Crank Linkage Assembly - Inspection

Legend for figure 1

Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. Bearing -			
Binding	Bearing shall move through 10 degree minimum cone angle using finger pressure only	Not reparable	Replace bearing per WP 427 00.
Wear	0.004 inch radial wear	Not reparable	Replace bearing per WP 427 00.
Staking	Snug fit at staking points	See Corrective Action	Restake per WP 427 00.
2. Arm -			
Cracks	Not serviceable	Not reparable	Replace arm.
Scattered surface damage	0.003 inch depth	Not reparable	Replace arm.
3. Diameter C -			
Bushings wear (stainless steel or composite)	0.3772 inch diameter	Not reparable	Replace bushing per WP 427 00.
4. Headless shoulder pin (Diameter E)			
Pin wear	0.3740 inch diameter minimum	Not reparable	Replace pin.
5. Flange surfaces F and G -			
Wear	Thickness H 0.457 inch minimum	Not reparable	Replace bushing per WP 427 00.
6. Diameter J	0.501 inch maximum	Not reparable	Replace arm.
7. Axial Wear	0.431 inch minimum	Not reparable	Replace bearing per WP 427 00.
8. Arm Wear	0.150 inch minimum	Not reparable	Replace arm.

WORK PACKAGE

TECHNICAL PROCEDURES

CLEVIS, ROD END -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	15	3	15	4 - 5	0
2	0			6 Blank	15

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

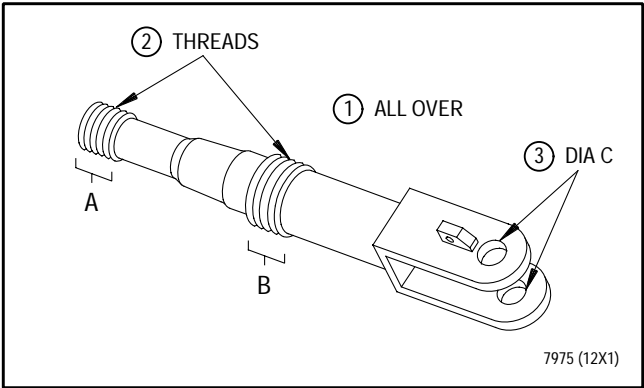
- a. This work package contains instructions for inspection of rod end clevises.

2. ROD END CLEVIS (RIGHT AND LEFT SIDE) - INSPECTION.

(See Figures 1 and 2.)

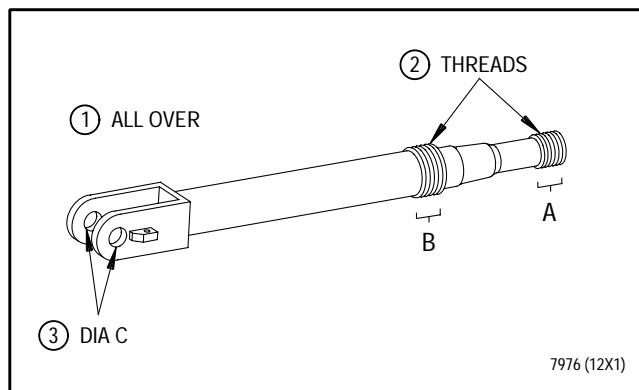
- a. Ensure that rod end clevis has been cleaned per WP 201 00.

- al. Inspect rod end clevis for cracks using fluorescent penetrant method. Refer to T.O. 2J-F100-9. No cracks allowed.
- b. Visually inspect rod end clevis using white light and 3X magnifying glass for surface damage and wear. See figures 1 and 2.



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All Over -			
Cracks	Not serviceable	Not reparable	Replace clevis.
Scattered surface damage	0.003 inch depth	Not reparable	replace clevis.
2. Threads -			
Damage Area A	Not serviceable	Not reparable	Replace clevis.
Damage Area B	Not serviceable	Not reparable	Replace clevis.
3. Diameter C (2 places) -			
Wear	0.256 inch diameter maximum	Not reparable	Replace clevis.

Figure 1. Rod End Clevis (Right Side) - Inspection



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All Over -			
Cracks	Not serviceable	Not reparable	Replace clevis.
Scattered surface damage	0.003 inch depth	Not reparable	Replace clevis.
2. Threads -			
Damage Area A	Not serviceable	Not reparable	Replace clevis.
Damage Area B	Not serviceable	Not reparable	Replace clevis.
3. Diameter C (2 places) -			
Wear	0.256 inch diameter maximum	Not reparable	Replace clevis.

Figure 2. Rod End Clevis (Left Side) - Inspection

WORK PACKAGE**TECHNICAL PROCEDURES****SEAL RING, NO. 1 BEARING METAL -****INSPECTION****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 5					
6 Blank					

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of No. 1 bearing metal seal ring.

2. NO. 1 BEARING METAL SEAL RING - INSPECTION.

(See Figure 1.)

- a. Inspect seal ring for cracks using fluorescent penetrant method. Refer to T.O. 2J-F100-9. No cracks allowed.

- b. Visually inspect seal ring using white light and 3X magnifying glass for surface damage and wear. See figure 1.
- c. Inspect Dimension F by applying a 1.5 to 3.0 pound load at Points D and E. Dimension F shall equal Diameter A, 4.734 inches.

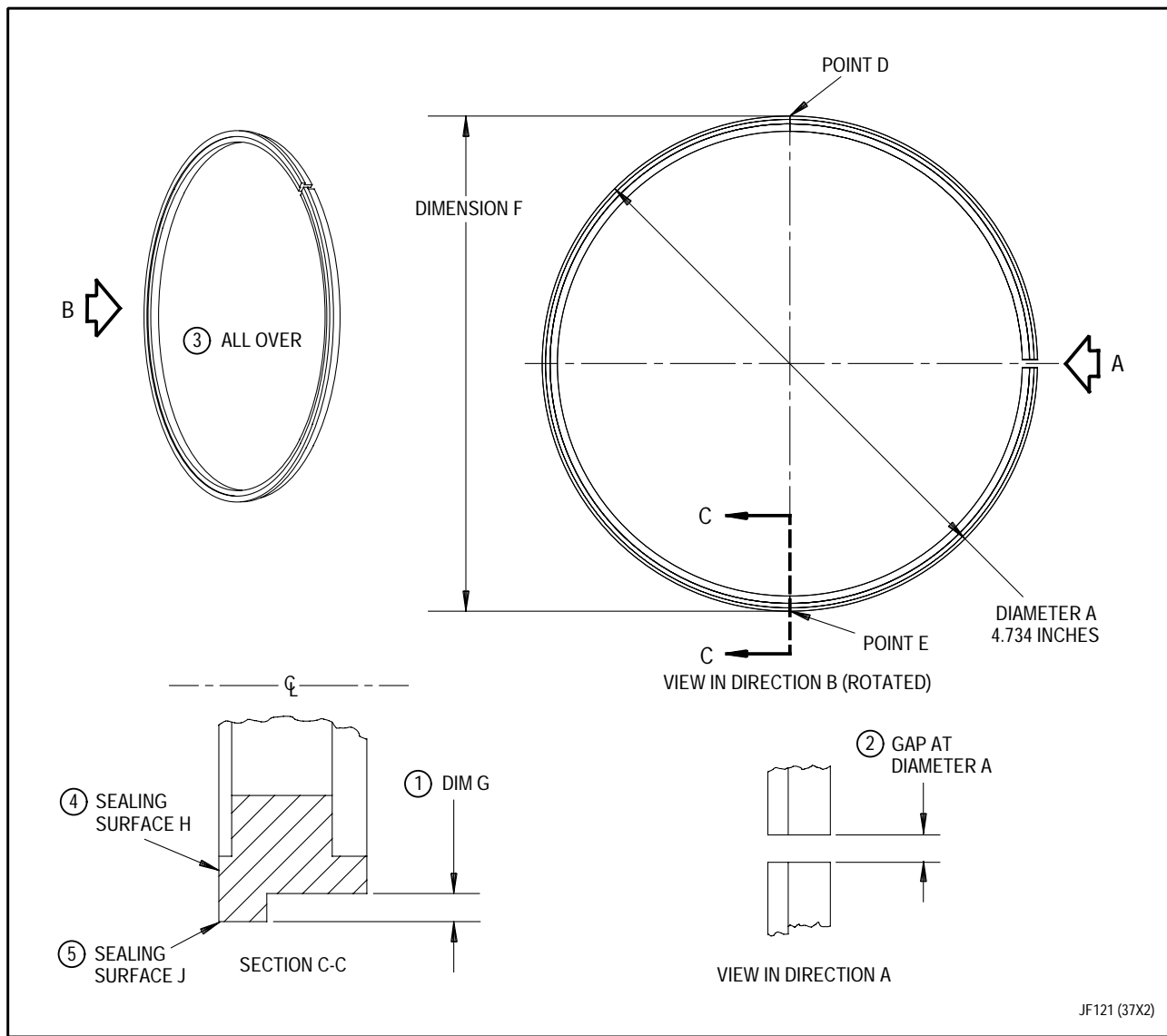


Figure 1. Metal Seal Ring (No. 1 Bearing Seal Sealing Ring) - Inspection

Legend for figure 1

Inspection Area Condition	Maximum Serviceable Limits	Maximum Reparable Limits	Corrective Action
1. Dimension G - Wear	0.022 to 0.032 inch	Not reparable	Replace ring.
2. Gap -	0.055 to 0.075 inch	Not reparable	Replace ring.
3. All over - Cracks	Not serviceable	Not reparable	Replace ring.
4. Sealing Surface H - Nicks, dents, scratches	Not serviceable	Not reparable	Replace ring.
5. Sealing Surface J - Nicks, dents, scratches	Not serviceable	Not reparable	Replace ring.

WORK PACKAGE

TECHNICAL PROCEDURES

SUPPORT ASSEMBLY, VARIABLE VANE, COMPRESSOR INLET -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	15	3	15	4	0
2	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

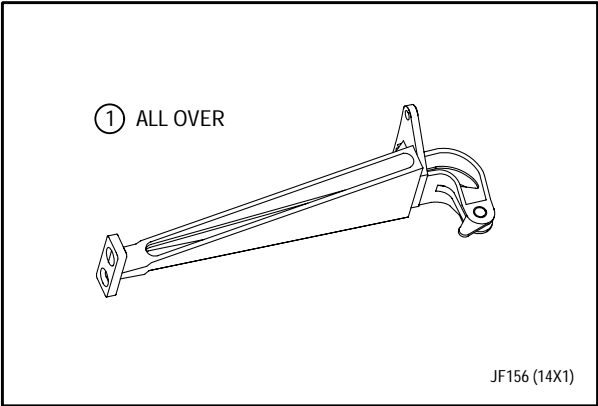
- a. This work package contains instructions for inspection of compressor inlet variable vane cylinder support assemblies.

**2. COMPRESSOR INLET VARIABLE VANE
CYLINDER SUPPORT ASSEMBLIES -
INSPECTION**

(See Figures 1 and 2.)

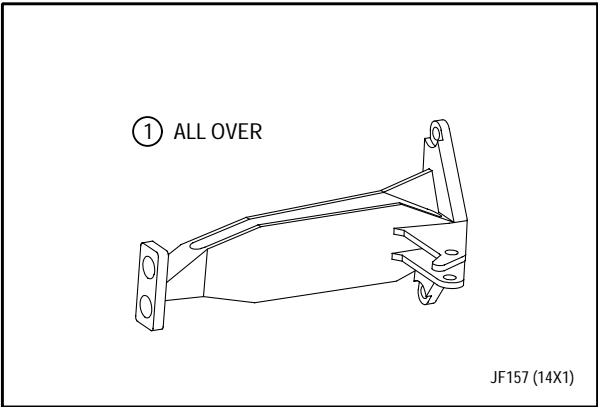
- a. Ensure that cylinder supports have been cleaned per WP 201 00.

- al. Inspect cylinder supports for cracks using fluorescent penetrant method. Refer to T.O. 2J-F100-9. No cracks allowed.
- b. Visually inspect cylinder support using white light and 3X magnifying glass for surface damage and wear. See figures 1 and 2.



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All over - Damage, cracks	Not serviceable	Not reparable	Replace support.

Figure 1. Compressor Inlet Variable Vane Cylinder Support (Left Side) - Inspection



Inspection Area Condition	Maximum Serviceable Limits	Maximum Repairable Limits	Corrective Action
1. All over - Damage, cracks	Not serviceable	Not reparable	Replace support.

Figure 2. Compressor Inlet Variable Vane Cylinder Support (Right Side) - Inspection

WORK PACKAGE

TECHNICAL PROCEDURES

BEARINGS, BALANCE -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3		0			
4 Blank		0			

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2	Balance Bearings - Inspection	
	Bearing, Compressor Front Hub - - - - -	PWA 21350-41
	Bearing, Compressor Rear Hub - - - - -	PWA 21350-42

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for inspection of balance bearings.

2. BALANCE BEARINGS - INSPECTION.

(See Tool Group 1 and Tables 1 and 2.)

- a. Dimensionally inspect balance bearings per table 1 and T.O. 2-1-111.

Table 1. Balance Bearing Tolerance Limits

Bearing Location	PWA Tool Number	OD	OD Tolerance	Bore Diameter	Bore Diameter Tolerance	Bearing Radial Clearance	Concentricity		Serviceable Limits				
									Diameter		Radial Clearance	Concentricity	
							Inner Race	Outer Race	OD	ID		OD	ID
Front Compressor Front Hub	21350-41	5.6250	+0.0002 -0.0006	3.9413	+0.0010 -0.0007 **0.0005 0.0030		0.0002	0.0030	None	+0.0010 -0.0007	0.0005 0.0030	0.0030 Max	0.0002 Max
Front Compressor Rear Hub	21350-42	6.500	+0.0002 -0.0006	4.3900	+0.0010 -0.0007 **0.0005 0.0030		0.0002	0.0030	None	+0.0010 -0.0007	0.0005 0.0030	0.0030 Max	0.0002 Max

Table 2. Adapter Tools

Bearing Location	PWA Tool Number	Bore Tolerance	PWA Tool Number Eccentricity Checking Adapter*	
			Outside Diameter Race	Inside Diameter Race
PWA 52350 Balance Arbor	21350-2	+0.0001 -0.0003	22786	22785
Front Compressor Front Hub	21350-41	+0.0001 -0.0004	22371	22772
Front Compressor Rear Hub	21350-42	+0.0001 -0.0004	22775	22774

*Use adapters with PWA 14484 weight

WORK PACKAGE

TECHNICAL PROCEDURES

BRACKET ASSEMBLY, CONNECTING LINK -

INSPECTION

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	27	3	15	4	27

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Nondestructive Inspection Procedure (Repetitive) -	
Fluorescent Penetrant - - - - -	SWP 004 03
Inlet Fan Module - - - - -	T.O. 2J-F100-53-6
Inlet/Fan Module - Cleaning - - - - -	WP 201 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

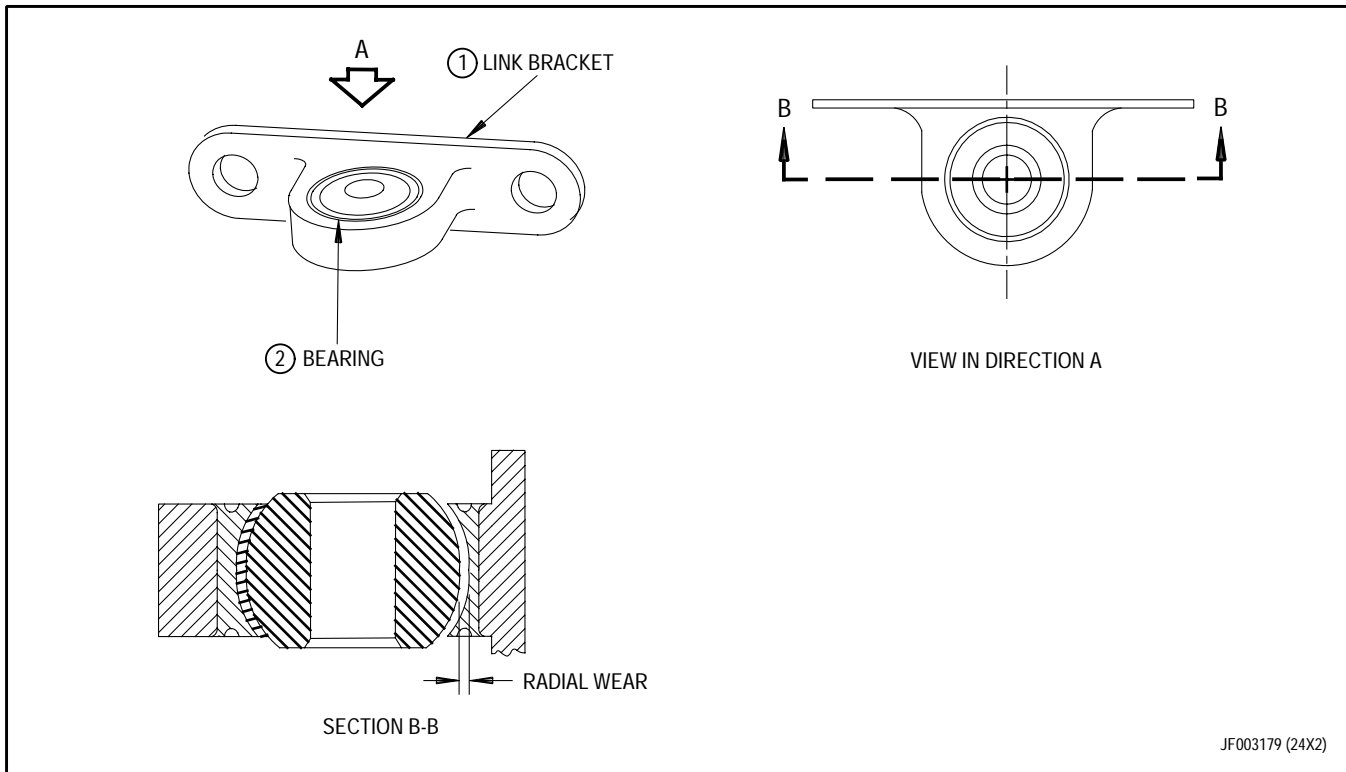
- a. This work package contains instructions for inspection of connecting link bracket assembly.

2. CONNECTING LINK BRACKET ASSEMBLY - INSPECTION.

(See Figure 1.)

- a. Ensure that link bracket assembly has been cleaned per WP 201 00.

- al. Inspect link bracket assembly for cracks using fluorescent penetrant method. Refer to T.O. 2J-F100-9. No cracks allowed.
- b. Visually inspect link bracket assembly using white light and 3X magnifying glass for surface damage and wear. See figure 1.



Inspection Area Condition	Maximum Serviceable Limits	Maximum Serviceable Limits	Corrective Action
1. Link bracket -			
Cracks	Not serviceable	Not reparable	Replace link bracket assembly.
2. Bearing -			
Binding	Bearing shall move through 10° minimum cone angle using finger pressure only	Not reparable	Replace bearing. Refer to T.O. 2J-F100-53-5, WP 544 00.
Wear	0.008 inch radial wear	Not reparable	Replace bearing. Refer to T.O. 2J-F100-53-5, WP 544 00.
Stacking	Snug fit at staking points	Not reparable	Replace bearing. Refer to T.O. 2J-F100-53-5, WP 544 00.

Figure 1. Connecting Link Bracket Assembly - Inspection

WORK PACKAGE

INTRODUCTION

INLET/FAN MODULE -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	22	3	8	4 Blank	8

1. INTRODUCTION.

This work package introduces the 400 00 through 499 00 series of work packages for the inlet/fan module parts - Repair. The following work packages are included in this series:

WP No.	Title
401 00	Repair - General
402 00	Tube Assembly, Scavenge, No. 1 Bearing; and Tube Assembly, Ps2, Sense - Repair
403 00	Inverted Nut, Spanner; and Nut, Bearing Retaining, Internally Threaded, No. 1 Bearing - Repair
404 00	Bearing Assembly, Roller, No. 1 - Repair
405 00	Seat, No. 1 Bearing Seal - Repair
406 00	Seal Assembly, Face, No. 1 Bearing - Repair
407 00	Housing Assembly, No. 1 Bearing - Repair
408 00	Ring Assembly, Synchronizing, Front Compressor Stator, Inlet; and Lever Arm Assembly, Compressor Stator Linkage - Repair
409 00	Open
410 00	Case Assembly, Fan Inlet - Repair
411 00	Shroud, Front Compressor Stator, Inlet - Repair
412 00	Vane, Front Compressor Stator Variable - Repair
413 00	Open
414 00	Open
415 00	Blades, Compressor Rotor (First, Second, and Third Stages) - Repair
416 00	Seal, Air, Fan (First, Second, and Third Stages) - Repair
417 00	Open
418 00	Compressor Stator Assembly (First and Second Stages) - Repair
419 00 through 421 00	Open
422 00	Disk Assembly, Drum Rotor, Front Compressor - Repair
423 00	Open
424 00	Case Assembly, Fan - Repair
425 00	Support, Front Compressor Stator, Bell Crank, Inlet - Repair
426 00	Open

WP No.**Title**

427 00

Bellcrank Assembly, Front Compressor Stator Linkage
Inlet - Repair

428 00

Open

through

499 00

WORK PACKAGE

TECHNICAL PROCEDURES

REPAIR -

GENERAL

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4					0

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains general information applicable to part repair.

2. GENERAL.

- a. Instructions contained in repair work packages supplement judgement and experience of repair personnel. Correct interpretation of visual defects of wear, scuffing, pitting, etc. is result of years of experience in area of engine parts inspection and repair. As a guide, experienced personnel should carefully follow inspection/repair data and use good common sense.

3. CORROSION CONTROL.

- a. Protection from corrosion damage is required if parts are not installed/assembled soon after repair. All unprotected surfaces of steel parts and parts known to have corrosion difficulties must be lightly coated with corrosion preventive oil conforming to MIL-C-15074 (AMS 3065).

4. HIGH METAL - REMOVAL.

- a. Remove high metal using hand tools only (i.e., files, emery cloth, honing stone, etc). Do not use power tools. Remove high metal so surface is flush with surrounding area and surface finish is comparable with adjacent areas.

5. STOP - DRILLING.**NOTE**

Stop - drilling prevents an existing crack from spreading.

- a. Locate ends of crack. Use local application of fluorescent penetrant inspection.
- b. Using a cobalt drill, drill a hole at each end of crack.
- c. Inspect drilled holes to ensure crack does not extend beyond.

6. PROTECTORS AND COVERS.

- a. If tool protector or cover was installed on part during disassembly, it must be removed for repair of part.
- b. Install tool protector or cover upon completion of repair.

WORK PACKAGE

TECHNICAL PROCEDURES

**TUBE ASSEMBLY, SCAVENGE, NO. 1 BEARING;
AND TUBE ASSEMBLY, Ps2, SENSE -**

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 4	0				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Cloth, emery	-
Rod, rubberized abrasive	CRATEX Grit No. 86XF
Wheel, buffing	GSW - 042145

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for repair of No. 1 bearing scavenge tubes and Ps2 sensing tubes.

2. TUBES - BLEND REPAIR.

(See Table 1.)

NOTE

To prevent part damage or failure blending of sharp edges, scratches, nicks, gouges, and pitting must be accomplished by hand operation. Power grinding is prohibited.

- a. Refer to Table 1 to determine material of tube.

NOTE

Improper blending can result in part failure due to stresses originating in damaged or repaired area.

- b. Blend titanium tubes as follows:

NOTE

Blending must provide minimum radius of 0.060 inch. Depth of blend must not exceed 0.006 inch measured from smooth area of tube adjacent to blend repair.

- (1) Blend using hand-held CRATEX Grit No. 86XF abrasive rod.
- (2) Polish blend using buffing wheel.

- c. Blend stainless steel tubes as follows:

NOTE

Blending must provide minimum radius of 0.060 inch. Depth of blend must not exceed 0.008 inch measured from smooth area of tube adjacent to blend area.

- (1) Blend using hard abrasive stick or fine emery paper.
 - (2) Polish blend using buffing wheel.
- d. After rework, following must be accomplished:
 - (1) Visually inspect using 8X magnifying glass.
 - (2) Pressure check per paragraph 3.

Table 1. No. 1 Bearing Scavenge and Ps2 Sense Tube Assemblies

Part Number	Nomenclature	Material	OD (Inch)	Wall Thickness (inch)
4071625-01	No. 1 bearing scavenge tube assembly	Titanium alloy	0.377	0.028
4071626-01	No. 1 bearing scavenge tube assembly	Titanium alloy	0.377	0.028
4071694-01	Ps2 sense tube assembly	Stainless steel	0.250	0.028
4071695-01	Ps2 sense tube assembly	Stainless steel	0.250	0.028

3. NO. 1 BEARING SCAVENGE AND Ps2 SENSING TUBE ASSEMBLIES - PRESSURE CHECK.

- a. Locally manufacture caps, plugs, etc., as required.
- b. Using standard pressure checking procedure, check tubes to 500 psi.

4. FOLLOW-ON MAINTENANCE.

- a. Install No. 1 bearing scavenge and Ps2 sensing tube assemblies onto inlet/fan module per WP 704 00.

WORK PACKAGE**TECHNICAL PROCEDURES**

**INVERTED NUT, SPANNER; AND NUT, BEARING RETAINING,
INTERNALLY THREADED, NO. 1 BEARING -**

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	0				
4 Blank	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for repair of No. 1 bearing internally threaded and inverted spanner nuts.

**2. NO. 1 BEARING INTERNALLY THREADED
AND INVERTED SPANNER NUTS - BLEND
REPAIR.**

- a. All local blending shall extend to distance of at least 15 times depth of damage.
- b. Surface finish of all blends shall be as smooth or smoother than original finish.

WORK PACKAGE

TECHNICAL PROCEDURES

BEARING ASSEMBLY, ROLLER, NO. 1 -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	28	3	28	4 Blank	0
2	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
Qualified Repair Source Listing (QRSL) - - - - -	WP 600 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for repair of No. 1 roller bearing assembly.

2. NO. 1 ROLLER BEARING ASSEMBLY - REPAIR.

(See Table 1.)

NOTE

The Vendor Repair Procedure List in Qualified Repair Source List (QRSL) must be kept current by incorporation of all Technical Order (T.O.) changes that affect repaired parts. If vendor procedure revision date listed does not incorporate T.O. changes, vendor must submit a procedure revision to Pratt & Whitney for review and update of procedure/revision data listed in QRSL.

- a. No. 1 bearings which do not meet inspection requirements shall be processed for repair and reidentification per SL237737, SL237738, SL237739, SL241058, SL239347, and SL241057.
- b. No. 1 roller bearing assembly repair is a proprietary repair. Affected logistics control numbers (LCN) and task codes are listed in table 1. For a Qualified Repair Source List (QRSL), refer to T.O. 2J-F100-53-1, WP 600 00.

Table 1. Proprietary Repair

LCN CODE	TASK CODE	LOCATION
EEA5CY	JGDFGAQ, JGDFGAR, JGDFGAS, JGDFGAT	Cage
EEA5CY	JGDFGAC, JGDFGAD, JGDFGAE, JGDFGAF, JGDFGAG, JGDFGAH	Ring
EEA5CY	JGDFGAK, JGDFGAL, JGDFGAM, JGDFGAN, JGDFGAP	Roller
EEA5CY	JGDFGAJ	Outer race

3. NO. 1 ROLLER BEARING ASSEMBLY - PIN REPLACEMENT.

- a. Remove damaged pin per dowel removal procedure in T.O. 2-1-111.
- b. Chill new pin.
- c. Install replacement pin to projection length of 0.062 to 0.072 inch.

4. FOLLOW-ON MAINTENANCE.

- a. Install No. 1 roller bearing assembly in inlet/fan module per WP 702 00.

WORK PACKAGE

TECHNICAL PROCEDURES

SEAT, NO. 1 BEARING SEAL -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 4

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 3	0				
4 Blank	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
Lapping of Main Bearing Carbon Seals, Seal Plates, and Spacers - - - - -	SWP 091 05
Optical Flatness Check of Main Bearing Carbon Seals, Seal Plates, and Spacers - - - - -	SWP 091 06

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for repair of the No. 1 bearing seal seat.

2. NO. 1 BEARING SEAL SEAT - LAPPING REPAIR.

(See Figure 1.)

NOTE

- Lap seal seats by machine only. Hand lapping can cause deterioration of seal hardface coating. Check hardface thickness after lapping.
 - Lap only if required to meet serviceable limits or whenever seal seat is to be used with a carbon seal other than the one with which it has been operating or if carbon face seal has been lapped.
- For scratches, nicks, and dents only across sealing surface, raised metal can be polished flush if sealing surface finish is not affected. Maximum depth and width of scratch after raised material removal is 0.001 inch.
- a. Lap sealing surface (see figure 1) to obtain required surface finish and flatness. Refer to T.O. 2J-F100-53-1, SWP 091 05 and SWP 091 06.
 - b. Minimum of 0.002 inch thickness of flameplate shall remain after lapping. Use magna-gage, or equivalent, to check flameplate thickness.

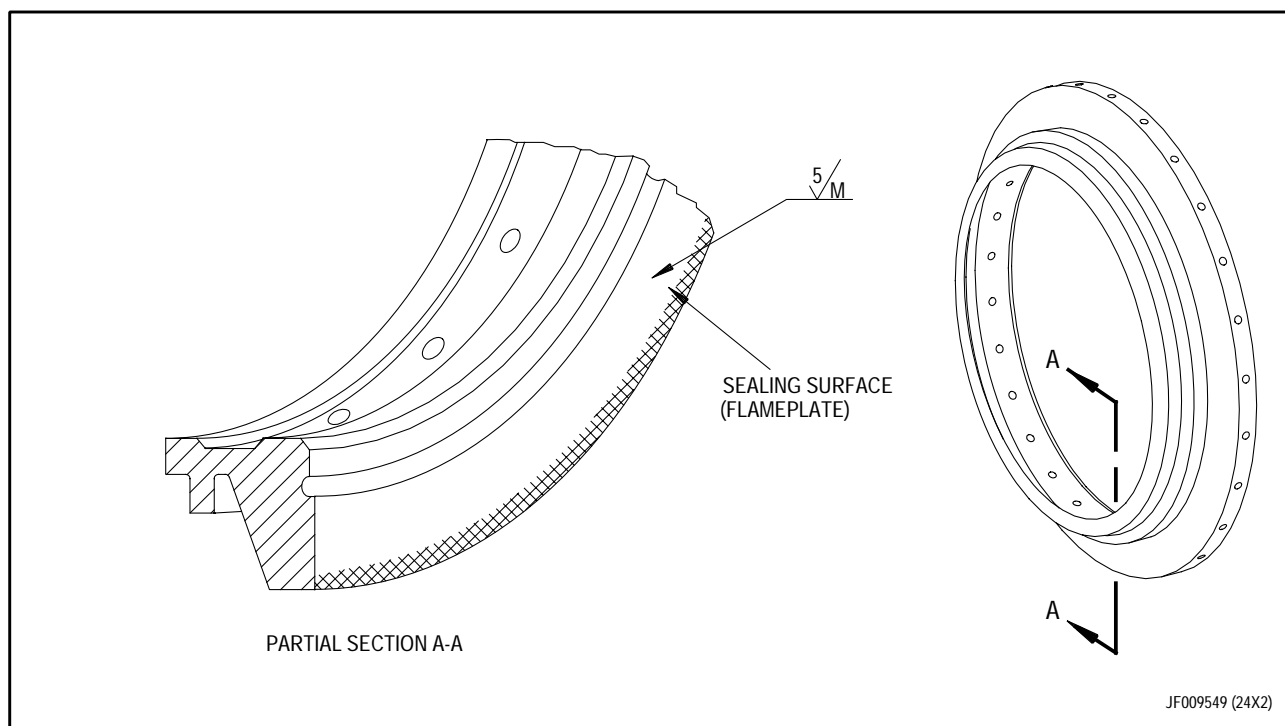


Figure 1. No. 1 Bearing Seal Seat - Lapping Repair

WORK PACKAGE**TECHNICAL PROCEDURES****SEAL ASSEMBLY, FACE, NO. 1 BEARING -****REPAIR****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 4

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1 - 3	0				
4 Blank	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
Lapping of Main Bearing Carbon Seals, Seal Plates, and Spacers - - - - -	SWP 091 05
Optical Flatness Check of Main Bearing Carbon Seals, Seal Plates, and Spacers - - - - -	SWP 091 06

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for repair of No. 1 bearing face seal assembly.

2. NO. 1 BEARING FACE SEAL ASSEMBLY - FACE SEAL ELEMENT LAPPING.

(See Figure 1.)

- a. Lap carbon seal sealing face to obtain required surface finish and flatness. Refer to T.O. 2J-F100-53-1, SWP 091 05 and SWP 091 06. Maintain perpendicularity and face seal height of figure 1.

3. NO. 1 BEARING FACE SEAL ASSEMBLY - SEAL HOUSING POLISH REPAIR.

- a. Remove high metal in damaged areas using file or fine stone.
- b. It is not necessary to remove scratches completely.

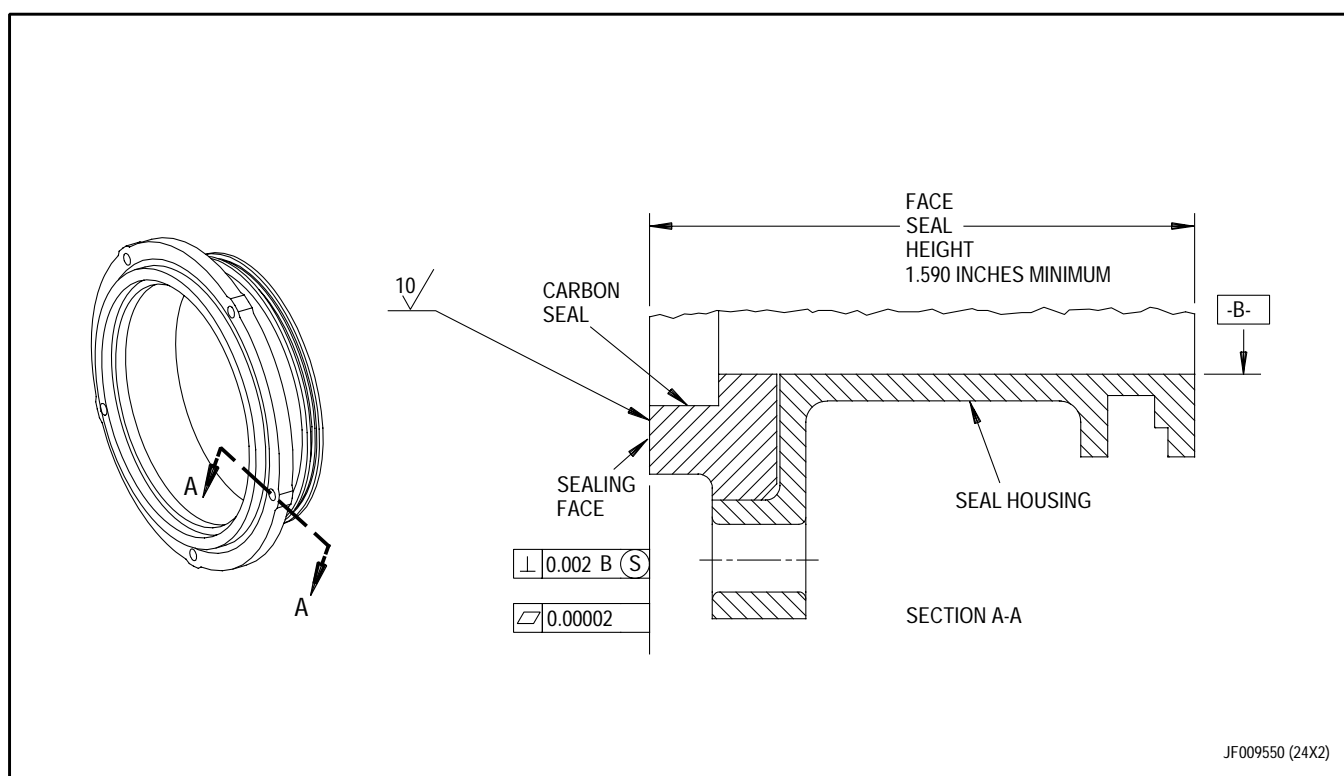


Figure 1. No. 1 Bearing Face Seal Assembly - Face Seal Element Lapping

JF009550 (24X2)

WORK PACKAGE

TECHNICAL PROCEDURES

HOUSING ASSEMBLY, NO. 1 BEARING -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 14

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	17	3	5	9 - 10	17
2A Added	17	4 - 8	0	11 - 12 Added	17
2B Blank Added	17				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
General Installation of Heli-Coil Inserts - - - - -	T.O. 44 H1-1-117
Nondestructive Inspection Procedures - - - - -	T.O. 2J-F100-9
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
General Repair Procedures - Welding, Inert Gas Fusion - - - - -	SWP 093 01
General Repair Procedures - Heat Treatment: Stress Relief Cycles (SPOP 455-1, 455-2, 455-3, 456, 457, 458-1, 458-2, 459-1, 459-2, 459-3, 460-1, 460-2, 461, 464, 466, 467, and 482) - - - - -	SWP 095 02
General Repair Procedures - Plasma and Flame Spray Coating Procedures, General - - - - -	WP 096 00
General Repair Procedures - Compound, Antigalling(PWA 36545) Application (SPOP 748) - - - - -	SWP 098 07

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Cloth, abrasive, crocus	P-C-458
Compound, antigalling (PWA 36545)	EsnaLube 382

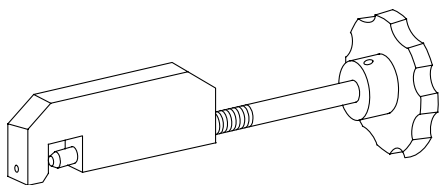
EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
RIVET	AN123313	AS REQUIRED

APPLICABLE SUPPORT EQUIPMENT

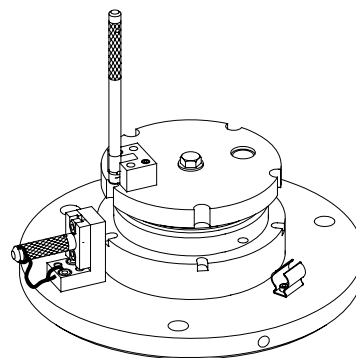
Paragraph	Function - Tool Nomenclature	Tool Number
3	NO. 1 BEARING HOUSING ASSEMBLY - SELF-LOCKING CLINCH NUT REPLACEMENT	
	PUSHER, CLINCH NUT - - - - -	PWA 55915
9	NO. 1 BEARING HOUSING ASSEMBLY - CARBON SEAL GUIDE PIN REPLACEMENT	
	DRILL FIXTURE - - - - -	PWA 71295

ILLUSTRATED SUPPORT EQUIPMENT



PWA 55915 -C

Figure T1. PWA 55915 PUSHER



PWA 71295 -C

Figure T2. PWA 71295 DRILL FIXTURE

1. INTRODUCTION.

- a. This work package contains instructions for repair of No. 1 bearing housing assembly.

2. NO. 1 BEARING HOUSING ASSEMBLY - CARBON SEAL GUIDE PIN REPAIR.

(See Figure 1.)

- a. Polish pin, with P-C-458 crocus cloth, in a lengthwise direction.

- b. Pin diameter shall not be reduced more than 0.002 inch.

3. NO. 1 BEARING HOUSING ASSEMBLY - SELF-LOCKING CLINCH NUT REPLACEMENT.

(See figure 1.)

- a. Remove and replace damaged clinch nut using PWA 55915 pusher to flare nut. Refer to T.O. 2-1-111.

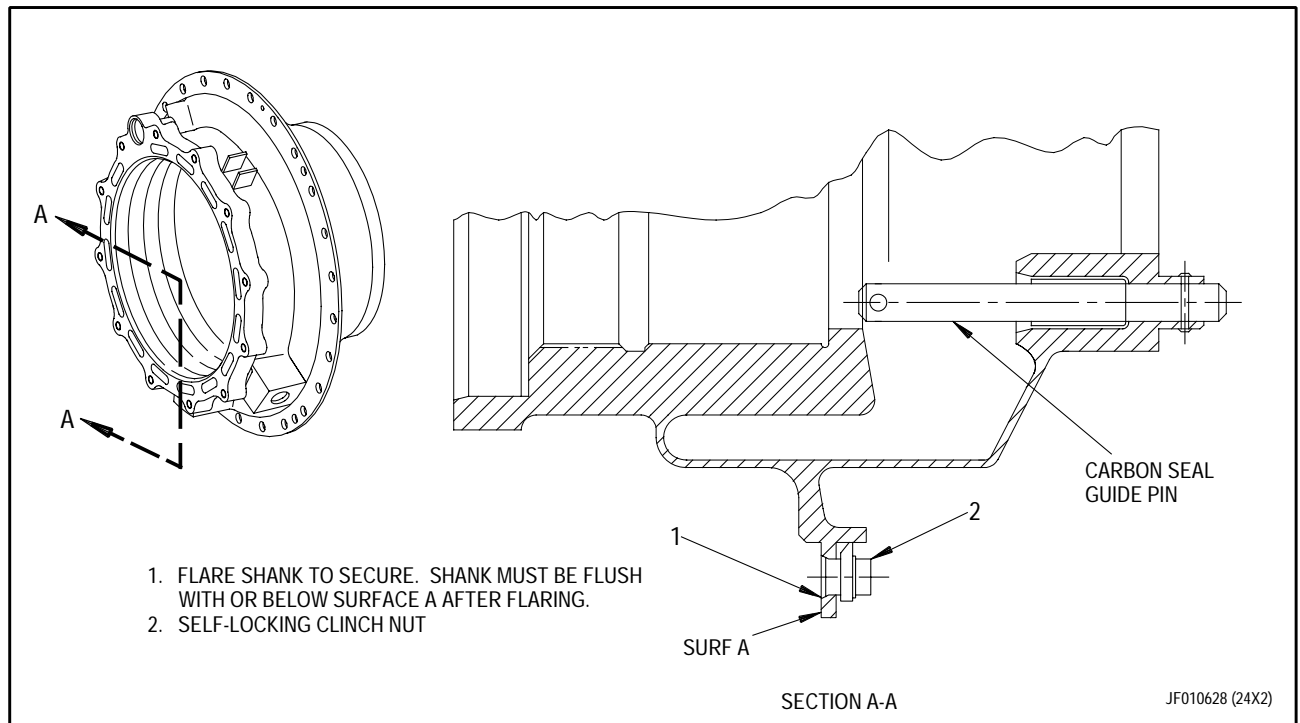


Figure 1. No. 1 Bearing Housing Assembly - Repair

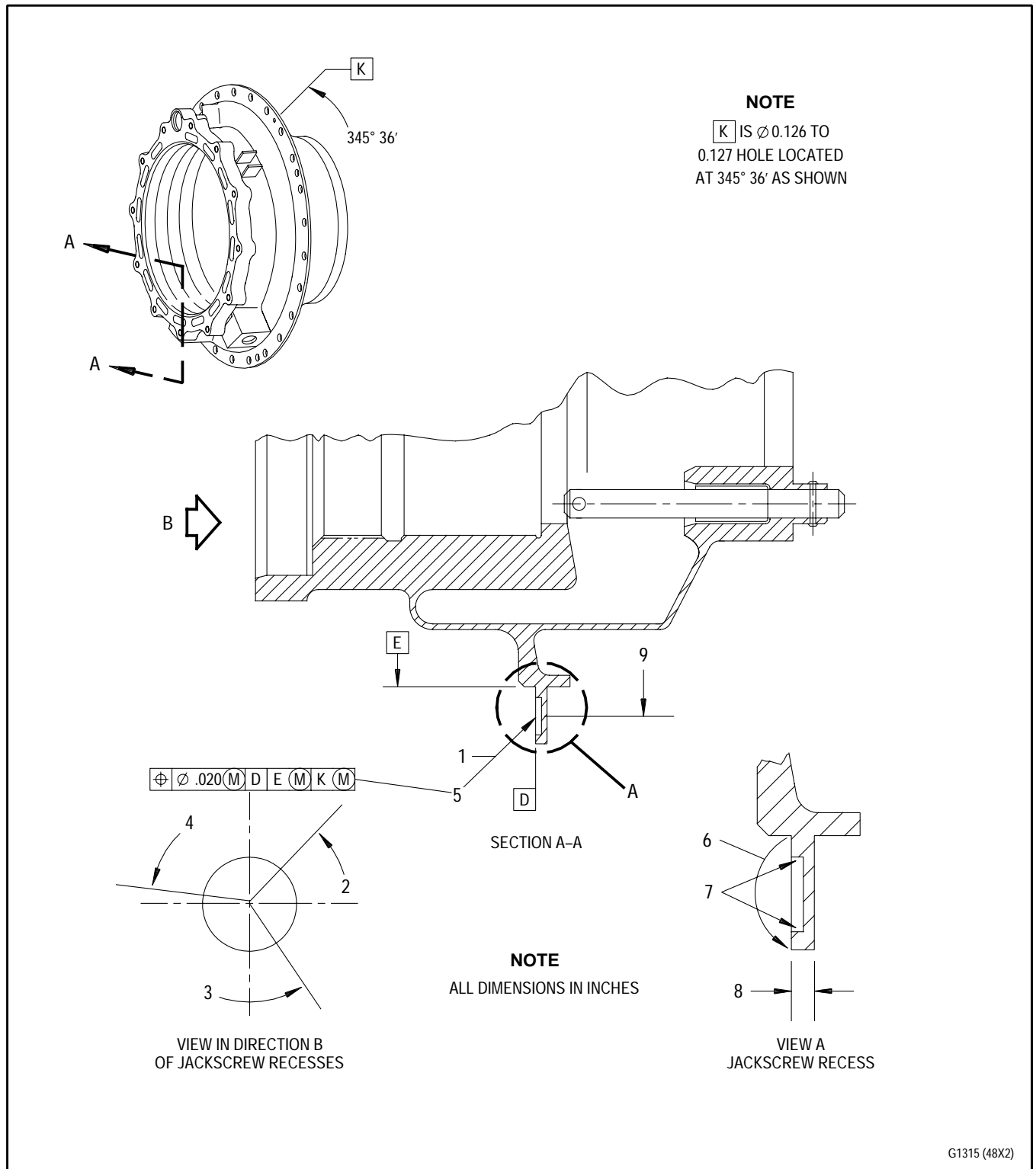
**4. NO. 1 BEARING HOUSING ASSEMBLY -
JACKSCREW RECESS REPAIR.**

(See Figure 2.)

- a. Machine any damaged jackscrew recess 0.250 inch diameter through.
- b. Fluorescent penetrant inspect recess area. Refer to T.O. 2J-F100-9. No cracks allowed.
- c. Weld hole closed using manual tungsten arc inert gas method and AMS 4954 or AMS 4956 weld metal per PWA 16-66. Refer to T.O. 2J-F100-53-1, SWP 093 01.
- d. Stress-relieve housing using following method.
 - (1) Locally stress-relieve welded area in argon at 1135° to 1165°F (613° to 629°C) for two hours. Refer to T.O. 2J-F100-53-1, SWP 095 02.
- e. Machine jackscrew hole(s). See figure 2. Remove any machine chips.
- f. Fluorescent penetrant inspect both sides of recess. Refer to T.O. 2J-F100-9. No cracks allowed.

Legend for figure 2

- 1. 0.245 to 0.255 inch diameter recess at locations 2, 3, and 4 as shown
- 2. 316° 48'
- 3. 216°
- 4. 86° 24'
- 5. True position of diameter shall be within 0.020 inch of Surface D, and Diameters E and K at Maximum Material Condition.
- 6. Mismatch between weld material and parent material 0.000 to 0.005 inch. Finish smooth or smoother than surrounding material.
- 7. 0.025 to 0.040 corner modified radius
- 8. Depth 0.040 to 0.060 inch
- 9. 9.200 inches diameter



G1315 (48X2)

Figure 2. No. 1 Bearing Housing Assembly - Jackscrew Recess Repair

**5. NO. 1 BEARING HOUSING ASSEMBLY -
OUTER SNAP DIAMETER REPAIR.**

(See figure 3.)

NOTE

Surface N must not be worn to perform this repair.

- a. Machine snap diameter to dimensions in figure 1. Ensure machining chips do not lodge in assembly.
- b. Fluorescent penetrant inspect machined surface for cracks. Refer to T.O. 2J-F100-9. No cracks allowed.

c. Plasma spray snap diameter. Refer to T.O. 2J-F100-53-1, WP 096 00. Use PWA 53-21 or PWA 53-37 coating process.

d. Machine plasma spray diameter to dimensions in Figure 3.

Legend for figure 3

- 1. 8.738 to 8.776 inch diameter
- 2. 0.000 to 0.020 inch
- 3. 0.020 to 0.030 inch modified radius
- 4. 0.060 to 0.080 inch. No grit blast or plasma spray permitted.
- 5. Plasma spray per step c.
- 6. 0.000 to 0.010 inch to runout of radius.
- 7. $45^{\circ} \pm 5^{\circ}$
- 8. 8.782 to 8.785 inch diameter
- 9. True position of diameter shall be within 0.001 inch of Surface H and Diameter N at Maximum Material Condition, and perpendicular to Surface D within 0.001 inch.
- 10.No plasma spray permitted
- 11.0.110 to 0.130 inch
- 12.This surface must be smooth with no steps.

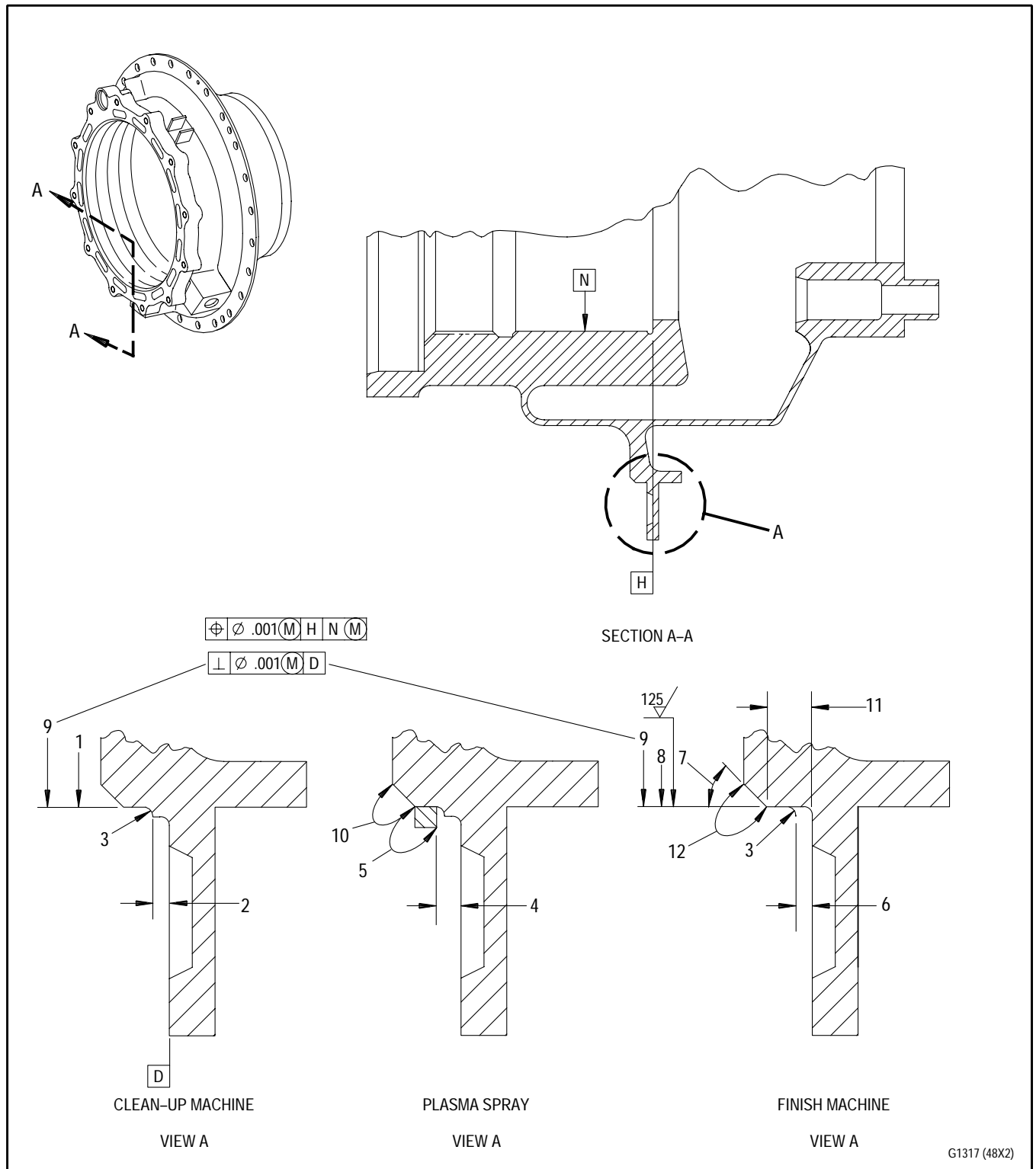


Figure 3. No. 1 Bearing Housing Assembly - Outer Snap Diameter Repair

**6. NO. 1 BEARING HOUSING ASSEMBLY -
SELF-LOCKING CLINCH NUT ANTIGALLING
COMPOUND APPLICATION.**

NOTE

Surface preparation is not required.

- a. Apply PWA 36545 antigalling compound to threads. Other surfaces are optional and can be incomplete. Refer to T.O. 2J-F100-53-1, SWP 098 07 (SPOP 748).

**7. NO. 1 BEARING HOUSING ASSEMBLY -
THREADED HOLE REPAIR.**

- a. Repair damaged threads. Refer to T.O. 44H1-1-117.

**8. NO. 1 BEARING HOUSING ASSEMBLY -
INNER SNAP DIAMETERS REPAIR.**

(See Figure 4.)

NOTE

Surface E must not be worn to perform this repair.

- a. Machine snap diameters to dimensions shown in figure 4. Ensure machining chips do not lodge in assembly.
- b. Fluorescent penetrant inspect machined surfaces for cracks. Refer to T.O. 2J-F100-9. No cracks allowed.
- c. Plasma spray snap diameters. Refer to T.O. 2J-F100-53-1, WP 096 00. Use PWA 53-21 or PWA 53-37 coating process.
- d. Machine plasma spray diameters to dimensions in figure 4.

Legend for figure 4

- 1. Clean-up machine 6.711 to 6.723 inches diameter. True position of diameter shall be within 0.002 inch of Surface D and Diameter E at Maximum Material Condition.
- 2. Clean-up machine 5.8866 to 5.9011 inches diameter. True position of diameter shall be within 0.001 inch of Surface D and Diameter E at Maximum Material Condition.
- 3. No grit blast or plasma spray permitted.
- 4. Plasma spray per step c.
- 5. Plasma spray can be optional and incomplete.
- 6. Final machine 6.701 to 6.705 inches diameter. True position of diameter shall be within 0.002 inch of Surface D and Diameter E at Maximum Material Condition.
- 7. Final machine 5.8791 to 5.8806 inches diameter. True position of diameter shall be within 0.001 inch of Surface D and Diameter E at Maximum Material Condition.
- 8. 0.060 to 0.090 inch
- 9. 0.024 to 0.029 inch
- 10. Chamfer to 0.020 to 0.040 inch X 45° ± 5°

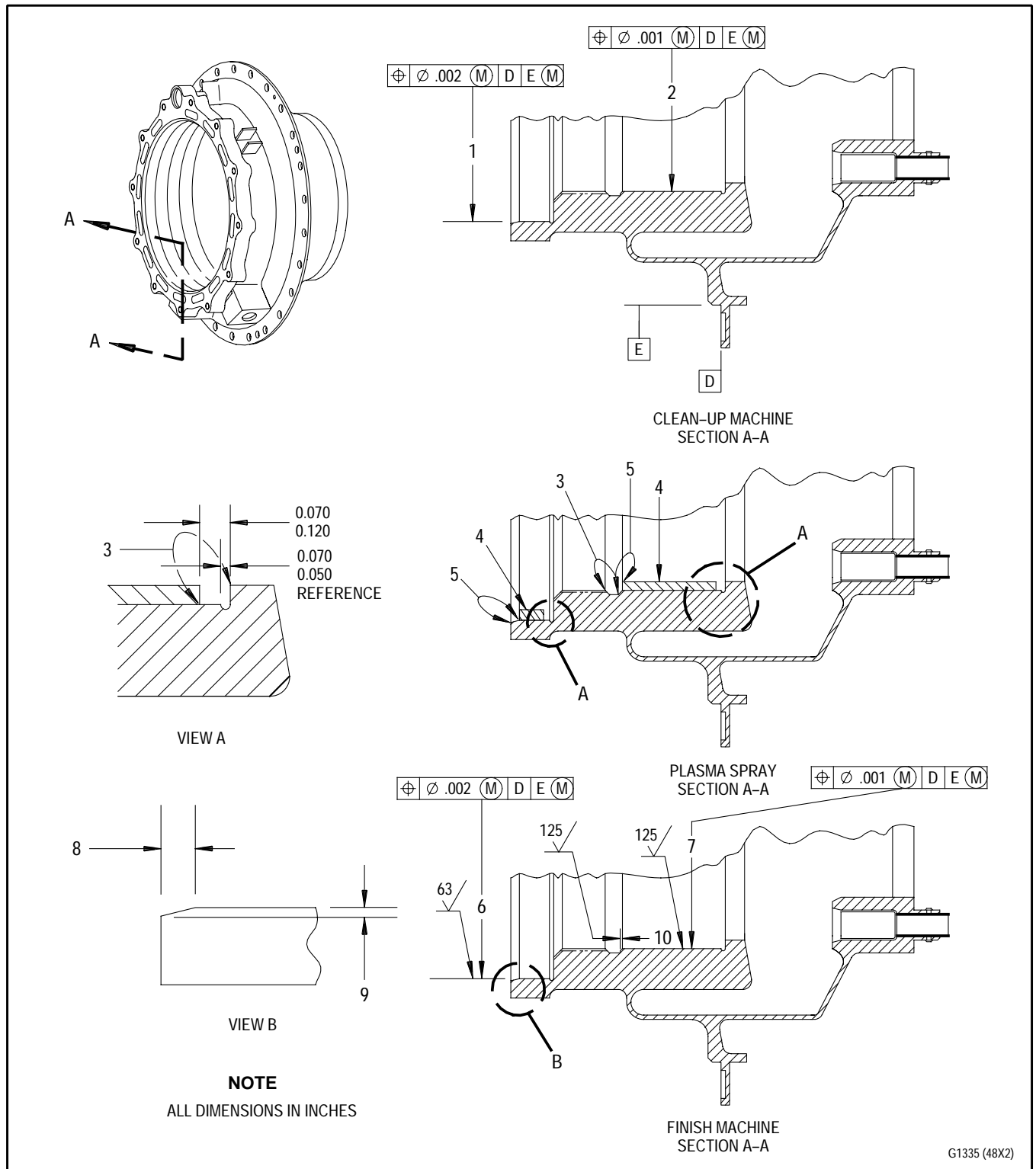


Figure 4. No. 1 Bearing Housing Assembly - Inner Snap Diameters Repair

**9. NO. 1 BEARING HOUSING ASSEMBLY -
CARBON SEAL GUIDE PIN REPLACEMENT.**

(See Figures 5 and 6.)

- a. Replace loose or missing guide pin in seal ring holder as follows:
 - (1) Machine off upset head of retaining rivet and drive out rivet.
 - (2) Remove pin from housing using arbor press.
- b. Install new guide pin and transfer drill rivet hole, using PWA 71295 fixture, as follows:

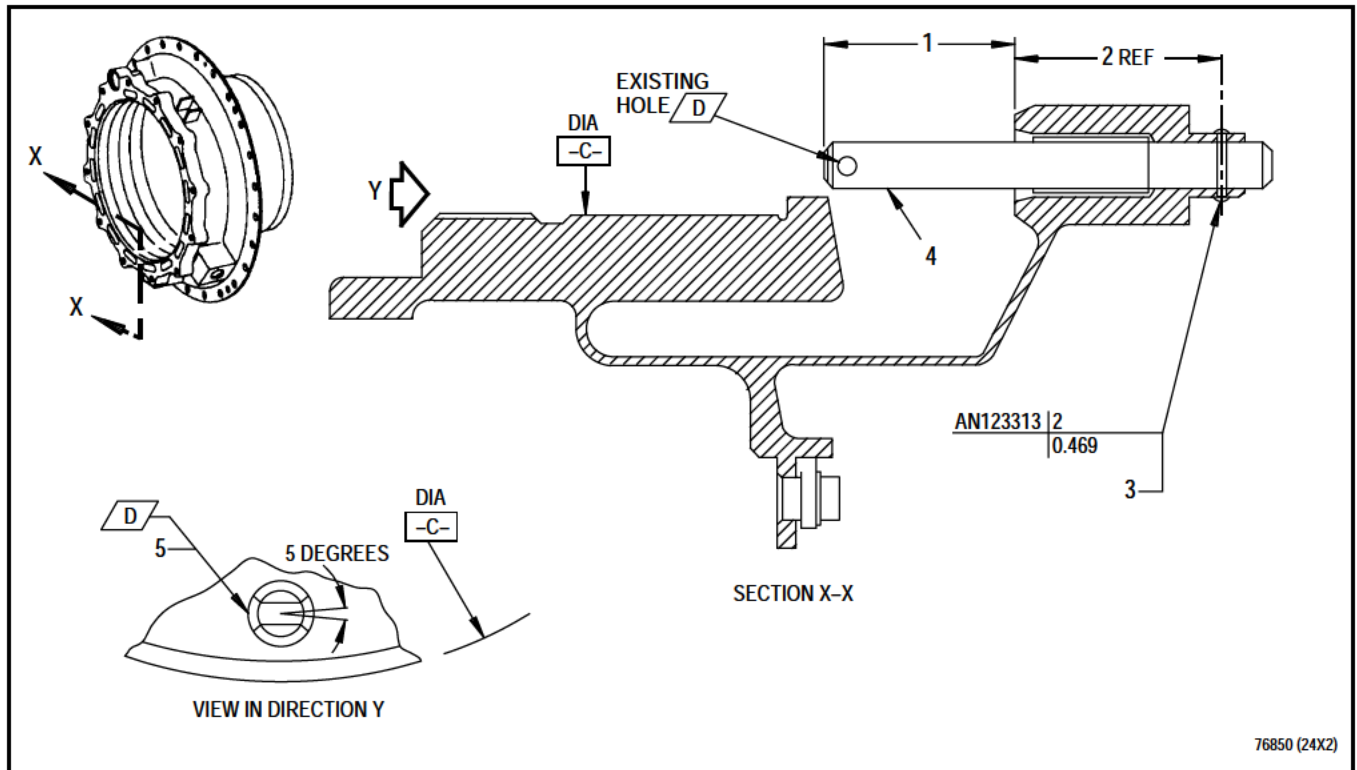
(See figure 6.)

 - (1) Remove top locator(4, figure 6) of PWA 71295 drill fixture from base(5).
 - (2) Install No. 1 bearing housing assembly housing(10) onto base of fixture, carbon seal end down. Rotate housing so that unserviceable guide pin is located at drill guide(8).
 - (3) Align and insert handle(7) through drill guide(8) and into existing rivet hole of housing.
 - (4) Install top locator(4) of PWA 71295 drill guide onto base(5), aligning diamond pin(3). Secure with screw(1) and washer(2), to lock drill guide.
 - (5) Remove handle(7).

NOTE

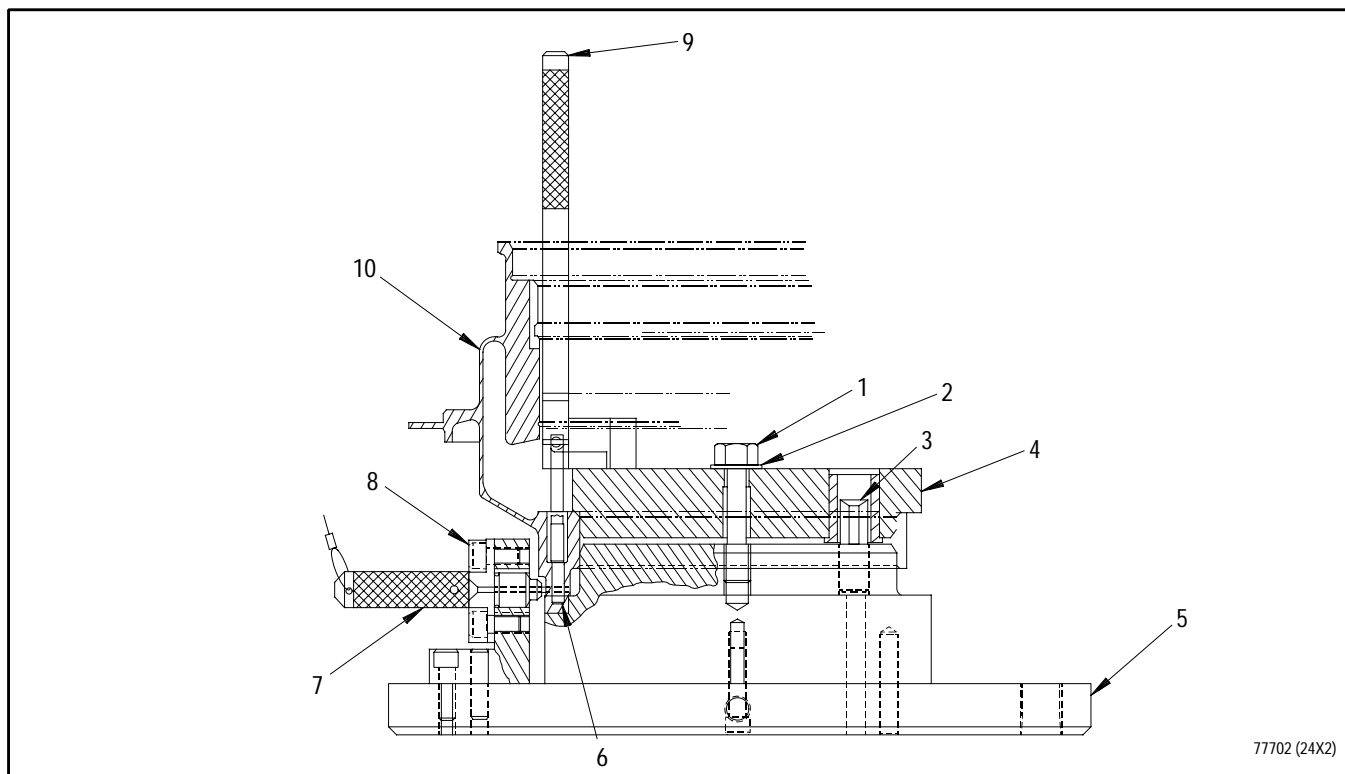
Detail buttons hold guide pin at cotter pin hole end, picking up locating slot for angular alignment as guide pin is installed.

- (6) Insert replacement pin(6) into detail handle(9).
 - (7) Chill replacement pin(6) in liquid nitrogen.
 - (8) Using arbor press, press on handle (9) and push guide pin(6) to final position.
 - (9) Transfer drill 0.0635 inch diameter hole in guide pin using No. 52 drill. Ensure that hole is located per requirements of figure 5.
 - (10) If required, remove top locator(4, figure 6) of PWA 71295 drill fixture and rotate housing to next guide pin position.
 - (11) If required, install top locator and repeat steps (3) through (11) for any of 5 unserviceable guide pins. Then install rivet per step c.
- c. Using CP 214-P-1 1/2 riveter, SM2004702 riveter, and P089495 sets and PN AN123313 rivet, rivet guide pin in place as shown in figure 5. Refer to T.O. 2-1-111.



1. 1.117 to 1.137 inches, 5 places
2. 1.145 inches reference, 5 places
3. PN AN123313 rivet, 5 required. Minimum edge distance waived.
4. Carbon seal guide pin
5. Existing hole in guide pin shall be in true position within 5 degrees

Figure 5. No. 1 Bearing Housing Assembly - Carbon Seal Guide Pin Replacement



1. Screw
2. Washer
3. Diamond pin
4. Top locator
5. Base
6. Carbon seal guide pin
7. Handle
8. Drill guide
9. Handle
10. No. 1 Bearing Housing Assembly

Figure 6. No. 1 Bearing Housing Assembly - Carbon Seal Guide Pin Replacement Using PWA 71295 Drill Fixture

WORK PACKAGE**TECHNICAL PROCEDURES**

**RING ASSEMBLY - SYNCHRONIZING, FRONT COMPRESSOR STATOR, INLET; AND
LEVER ARM ASSEMBLY, COMPRESSOR STATOR LINKAGE -**

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 14

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1	29	5 - 6	22	9 - 13 Added	29
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4	19				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures	T.O. 2-1-111

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

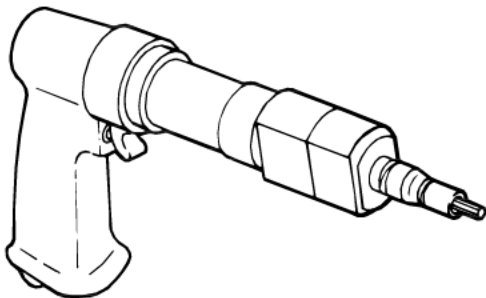
EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
Rivet	438863	AR

APPLICABLE SUPPORT EQUIPMENT

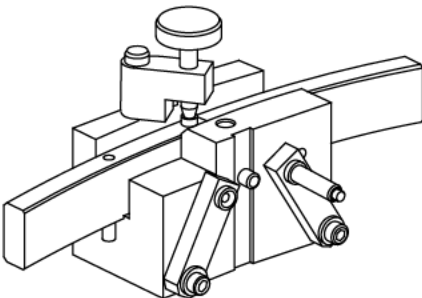
Paragraph	Function - Tool Nomenclature	Tool Number
2	Front Compressor Stator Inlet Synchronizing Ring Assembly - Bumper Replacement	
	Fixture, Drill - Synchronizing Ring	PWA 71494
3	Front Compressor Stator Inlet Synchronizing Ring and Compressor Stator Linkage Lever Arm Assembly - Removal and Installation	
	Air Driver, Hi-Lok/Hi-Torque	HLA 1051

ILLUSTRATED SUPPORT EQUIPMENT



HLA 1051 -C

Figure T1. HLA 1051 Air Driver



PWA 71494 -C

Figure T2. PWA 71494 Drill Fixture

1. INTRODUCTION.

- a. This work package contains instructions for repair of inlet front compressor stator synchronizing ring assembly and compressor stator linkage lever arm assembly.

2. FRONT COMPRESSOR STATOR INLET SYNCHRONIZING RING ASSEMBLY - BUMPER REPLACEMENT.

(See Figures 1 and 2.)

WARNING

Carbon fibers are electrically conductive and present an electrical shock hazard. Keep ignition source away and provide adequate ventilation. Prevent accumulations of graphite dust in work area and electrical equipment. Follow special handling/cleanup procedures and wear protective clothing/equipment.

NOTE

Following step should be performed in a controlled environmental room reserved for handling of composite materials.

- a. Remove manufactured rivet head by grinding. Refer to T.O. 2-1-111.
- b. Remove rivets using drift. Ensure no rivet material is left inside synchronizing ring following rivet removal. Remove bumper.
- c. Install replacement bumper on synchronizing ring assembly using PWA 71494 fixture as follows:
(See figures 1 and 2.)
 - (1) Retract detail-8, figure 1, locating pin from detail-7 bushing and loosen detail-3 cap screw.
 - (2) Remove detail-11 dummy segment from detail-1 base by turning detail-10 toggle screw counterclockwise. Loosen detail-13 thumb screw, detail-14 shoulder screw and swing detail-15 clamp block to provide clearance when removing segment.
 - (3) Position synchronizing ring on detail-1 fixture base. Install detail-8 locating pin into detail-7 bushing, aligning existing hole in synchronizing ring. Secure by tightening detail-10 toggle screw.
 - (4) Rotate detail-15 clamp block to secure synchronizing ring by tightening detail-13 thumb screw and detail-14 shoulder screw.
 - (5) Secure each detail-3 cap screw to maintain alignment of detail-8 locating pin when installed into synchronizing ring hole.
 - (6) Remove detail-8 locating pin from hole in synchronizing ring and loosen detail-10 toggle screw. Remove synchronizing ring.
 - (7) Loosen detail-14 shoulder screw, detail-13 thumb screw and rotate detail-15 clamp block.
 - (8) Position detail-11 dummy segment into detail-1 base with bumper and install detail-8 locating pin into detail-7 bushing and align existing hole in bumper.
 - (9) Tighten detail-10 toggle screw on surface of bumper and secure detail-14 shoulder screw.

- (10) Check to ensure bumper is clamped securely and minimum edge dimension(4, figure 2) is maintained.

NOTE

The following step shall be performed in a controlled environmental room reserved for handling of composite materials.

- (11) Transfer drill rivet holes (6) in replacement bumper.

- (12) Remove bumper from PWA 71494 fixture.

- (13) Align bumper to synchronizing ring holes and secure by installing PN 438863 rivets per figure 2. Refer to T.O. 2-1-111. Faying surfaces gap requirements shall be waived.

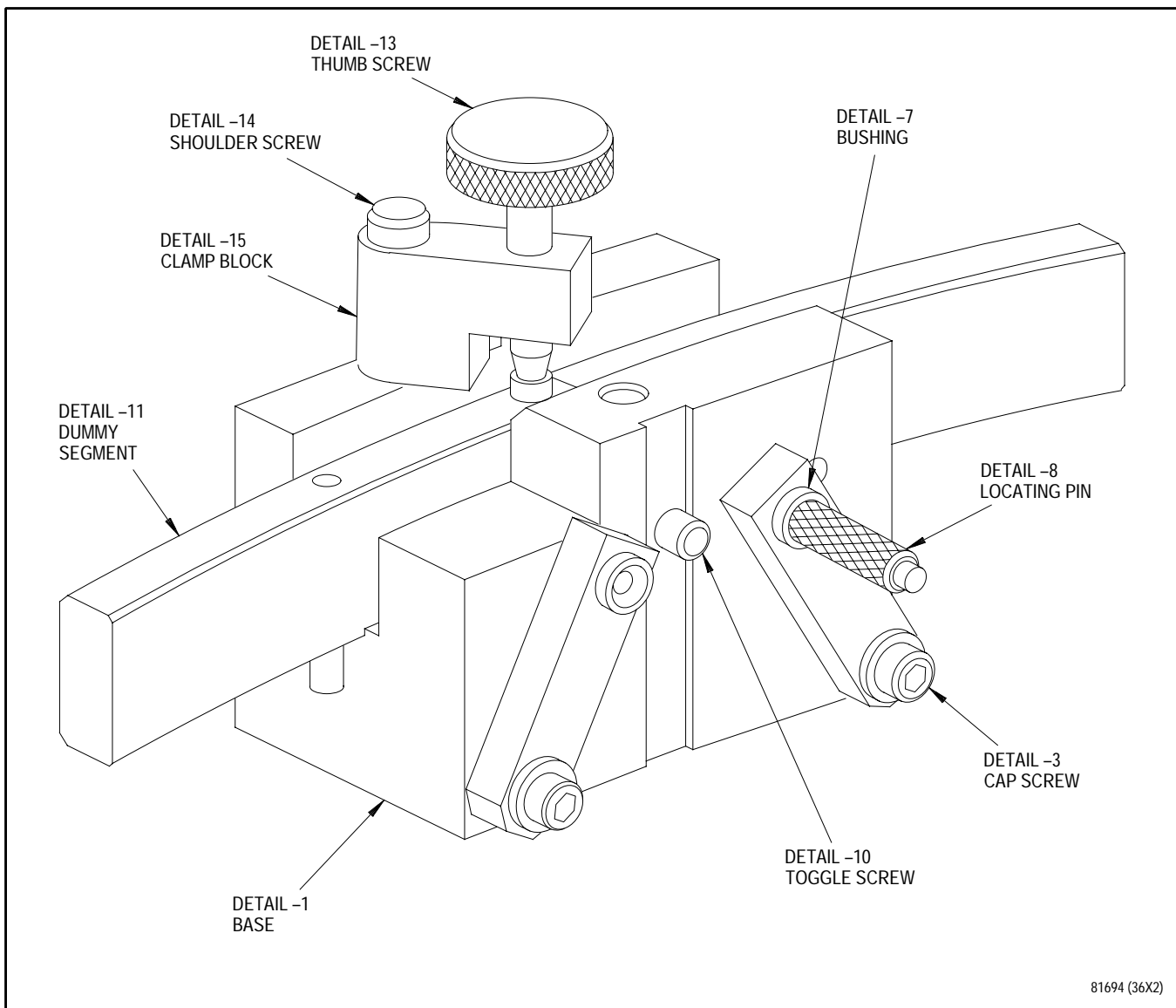


Figure 1. PWA 71494 Synchronizing Ring Drill Fixture.

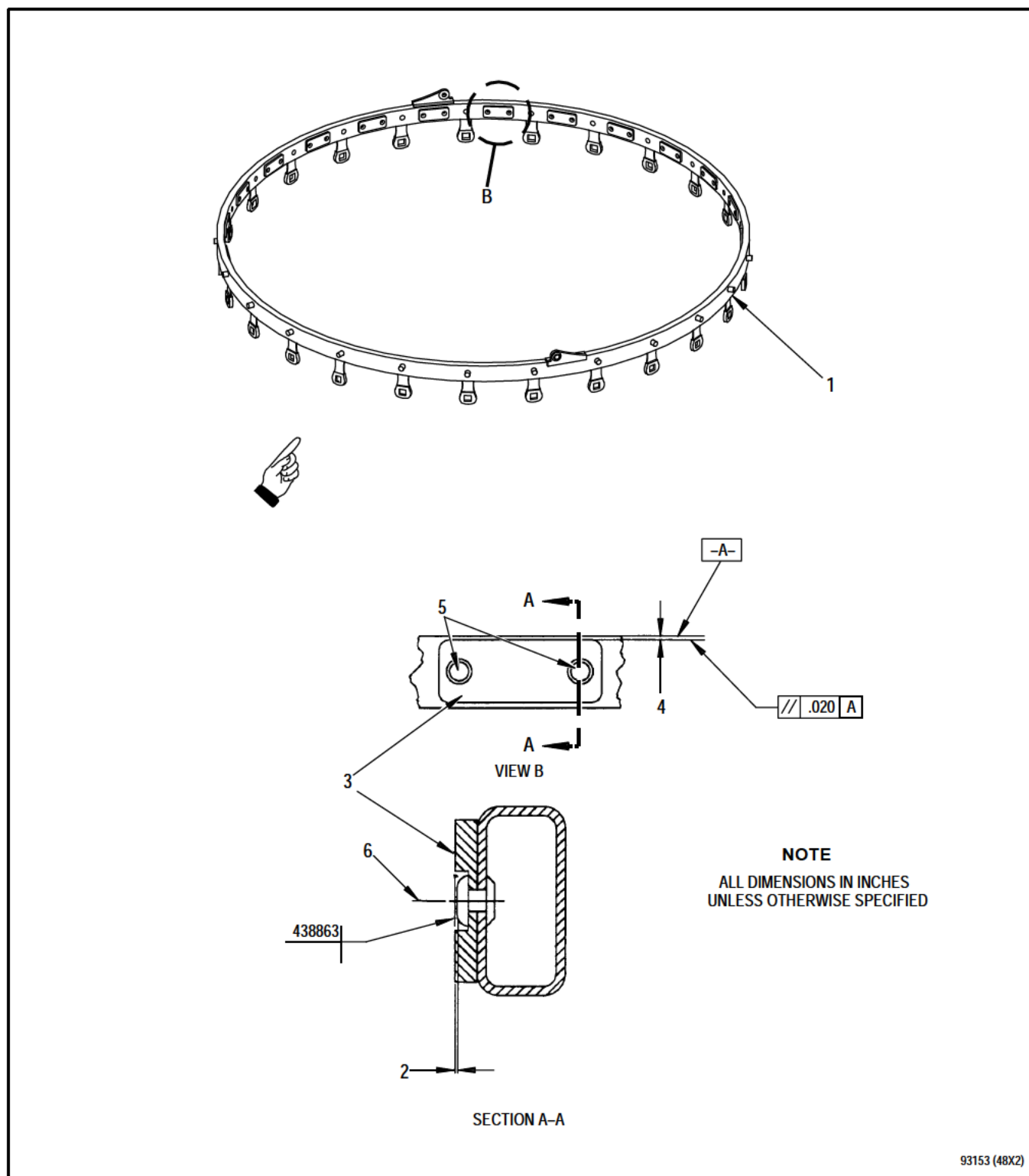


Figure 2. Inlet Synchronizing Ring - Bumper Replacement

Legend for figure 2

1. Synchronizing ring
2. 0.012 inch minimum
3. Bumper
4. 0.050 inch minimum, both sides
5. Blind rivet
6. 0.130 to 0.134 inch diameter

**3. FRONT COMPRESSOR STATOR INLET
SYNCHRONIZING RING AND COMPRESSOR
STATOR LINKAGE LEVER ARM ASSEMBLY -
REMOVAL AND INSTALLATION.**

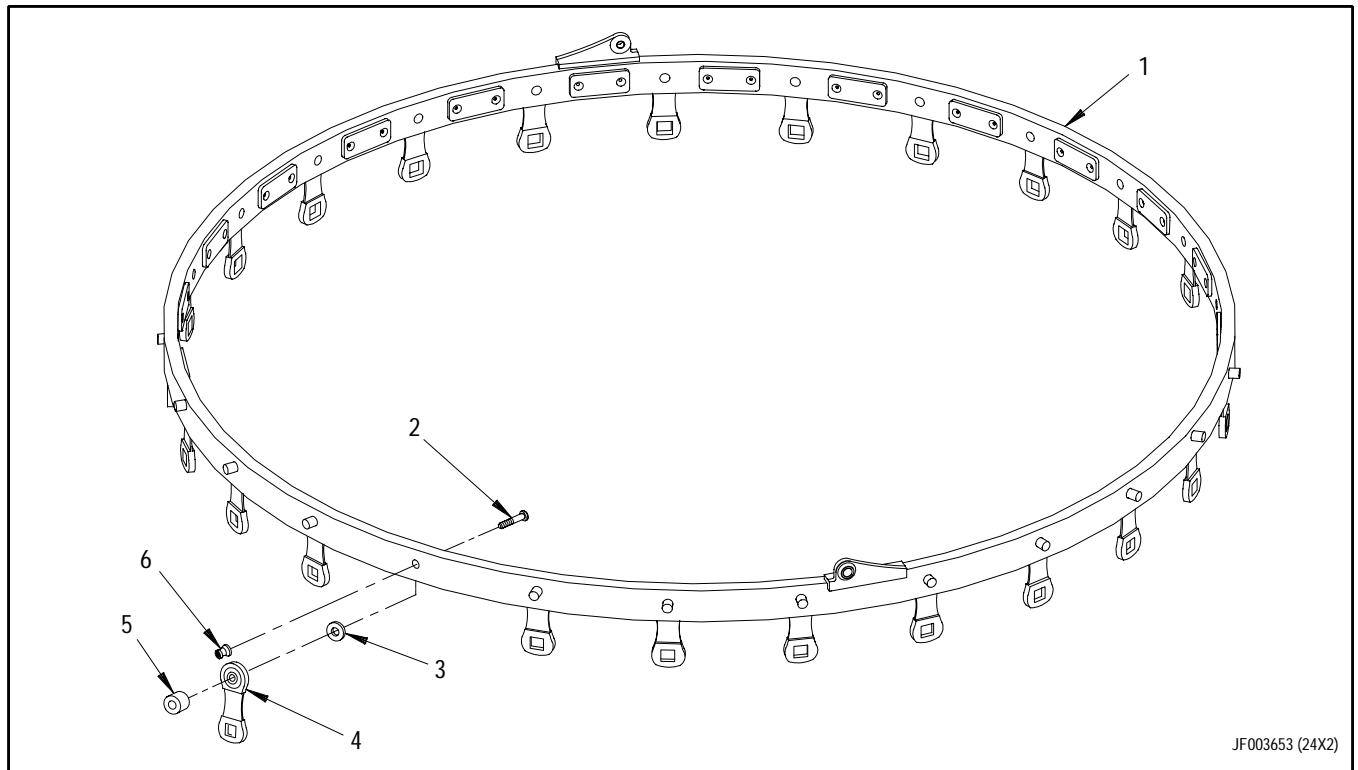
(See Figures 3 and 4.)

- a. Remove lever arm(4, figure 3) by removing collar(6), rivet pin(2), washer(3), and spacer(5). Discard collar, rivet pin, washer, and spacer.
- b. Install replacement lever arm(4, figure 3) onto synchronizing ring(1) as follows:
 - (1) Install lever arm(4) with small side of tapered hole facing outward.
 - (2) Install new rivet pin(2), washer(3), spacer(5), and collar(6).

NOTE

Wrenching flat of collar will shear off when proper torque is reached.

- (3) Torque collars using HLA 1051 air driver or hexagon wrench and open end wrench. See figure 4.



1. Synchronizing Ring
2. Rivet Pin
3. Washer
4. Lever Arm
5. Spacer
6. Collar

Figure 3. Front Compressor Stator Inlet Synchronizing Ring and Compressor Stator Linkage Lever Arm Assembly - Removal and Installation

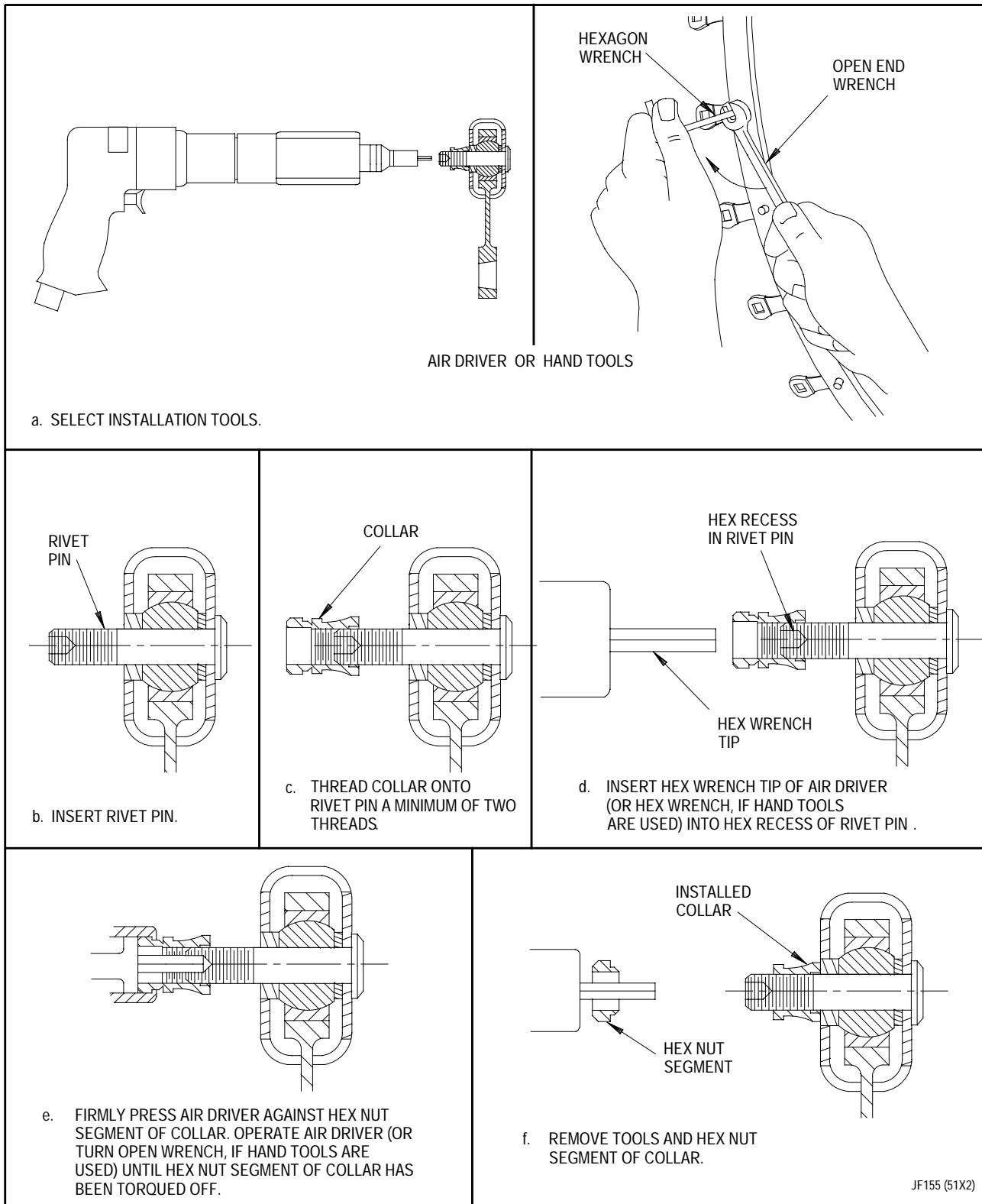


Figure 4. Front Compressor Stator Inlet Synchronizing Ring and Compressor Stator Linkage Lever Arm Assembly - Rivet Pin and Collar Installation Procedure

4. INLET FRONT COMPRESSOR STATOR SYNCHRONIZING RING ASSEMBLY - RIVET SPACER HOLE(S) REPAIR (TYPICAL PN 4072231)

(See Figures 5 and 6.)



- Use only approved tools, equipment, and materials that are dedicated solely for use on titanium or stress corrosion cracking, scratching, or other damage of titanium may result.
- Use only approved coolant such as PMC 9190 (TRIM (R) VHP E200PW) grinding fluid in machining and grinding equipment used on titanium or damage of titanium may result.
- See Safety Summary, Metal Machining Processes.

NOTE

- This repair of rivet spacer holes for threaded rivets may be modified as appropriate to repair any combination of holes.
- Parent material is PWA 1260 (PN 4072231) or AMS 4928 (PN 4077968) titanium alloy.
 - a. If both ID and OD rivet holes at same angular location require weld repair, refer to figure 5 for restoration requirements.
 - b. Remove all bumpers, lever arms, and uniball (self-aligning) bearings from synchronizing ring, if not already removed, per appropriate procedure in this work package.
- c. Machine to enlarge hole using appropriate method as follows:
 - (1) Rivet spacer hole (OD of ring): 0.557 inch diameter through one wall only. If hole surface is still has visible wear after enlarging hole, stop repair. Part is not reparable.
 - (2) Threaded rivet hole (ID of ring): 0.318 inch diameter through one wall only. If hole surface is still has visible wear after enlarging hole, stop repair. Part is not reparable.
- d. Clean part. Refer to T.O. 2-1-111, SPOP 209.
- e. Weld hole(s) closed using manual tungsten arc inert gas method and AMS 4954 or AMS 4956 weld metal per PWA 16. Refer to T.O. 2-1-111.
- f. Clean part. Refer to T.O. 2-1-111, SPOP 209.
- g. Furnace stress-relieve ring per SPOP 464 at 1125° to 1175°F (607° to 635°C) except heat treat for two hours in vacuum or argon. Alternate methods, times, and temperatures do not apply. Refer to T.O. 2-1-111.
- h. Dimensionally inspect part. In a free state, surface L is flat within 0.020 inch and diameter G is 36.220 to 36.340 inches.
- i. Machine hole(s) per figures 5 and 6.
- j. Break all edges 0.003 to 0.015 inch.
- k. Clean part. Refer to T.O. 2-1-111, SPOP 209.

1. Fluorescent penetrant inspect part per SPOP 82 and inspect per SFPS-38. Inspect both sides of repair hole(s). No cracks allowed. Refer to T.O. 2-1-111.
- m. Install bumpers, lever arms, and uniball (self-aligning) bearings onto synchronizing ring per appropriate procedure in this work package.

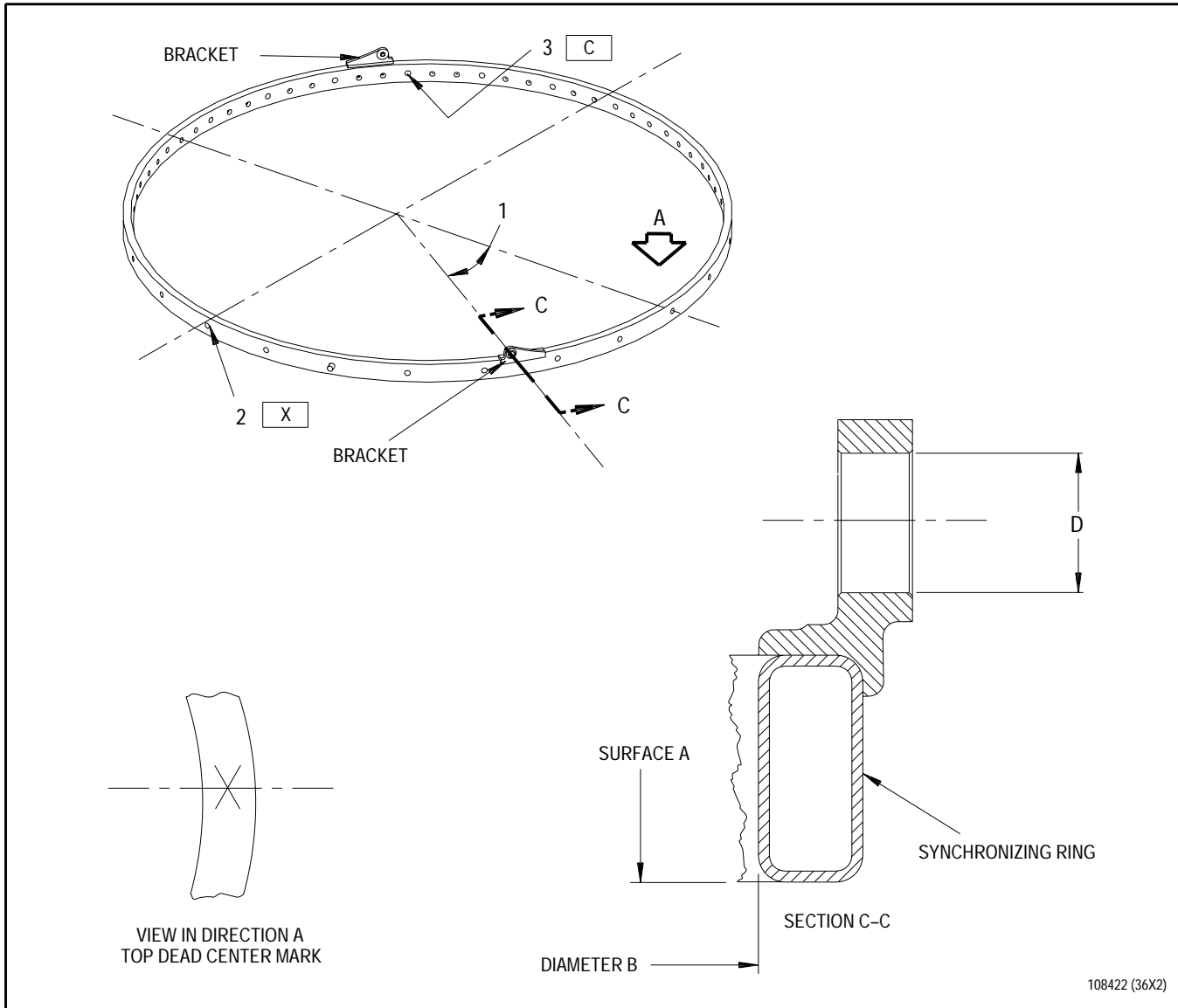


Figure 5. Inlet Synchronizing Ring - Rivet Hole(s) Description

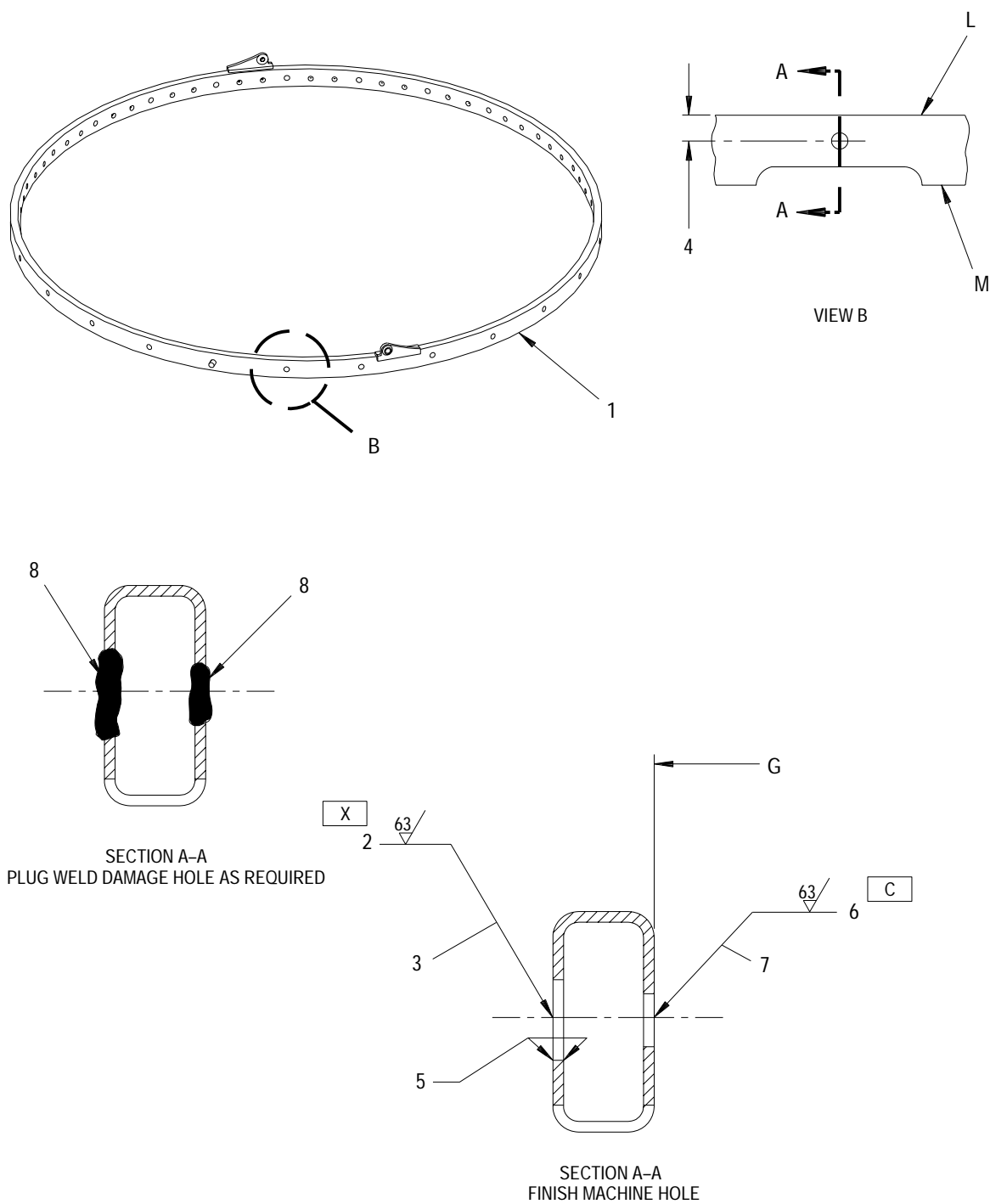
Legend for figure 5**NOTE**

Diameter C is located within 0.0025 inch radius of True Position at maximum material condition in relation to Surface A, Diameter B at maximum material condition, and Diameter D at maximum material condition.

D is a 0.6248 to 0.6253 inch reference diameter located as shown.

B is a 36.275 to 36.285 inch reference average diameter.

1. 37°18'48"
2. 0.312 to 0.313 inch Diameter X (OD of ring) - reference, 25 places equally spaced from top dead center.
3. 0.1895 to 0.1905 inch Diameter C (ID of ring) - reference, 25 places equally spaced.



108423 (48X2)

Figure 6. Inlet Synchronizing Ring - Rivet Hole(s) Repair

Legend for figure 6**NOTE**

Mismatch between weld material and parent material 0.000 to 0.005 inch. Finish smooth or smoother than surrounding material. Both sides.

Unless otherwise specified all dimensions apply when Surface L is flat within 0.005 inch total and Diameter B maintains a clearance envelope of 36.273 inch diameter in free state or constrained. Constraint contact allowed only on Surfaces L, M, and Diameter G. In free state Surface L is flat within 0.020 inch total and Diameter G is 36.220 to 36.340 inches.

1. Synchronizing ring - PN 4078173-02 typical
2. 0.312 to 0.313 inch Diameter X through one wall only
3. Concentricity of diameter shall be within 0.001 inch of Diameter C at maximum material condition
4. 0.500 inch
5. Break edge 0.005 inch maximum
6. 0.1895 to 0.1905 inch Diameter C through one wall only
7. Concentricity of diameter shall be within 0.001 inch of Diameter X at maximum material condition
8. Plug weld damage hole(s), as required per PWA 16.
Refer to T.O. 2-1-111.

WORK PACKAGE**TECHNICAL PROCEDURES****CASE ASSEMBLY, FAN INLET -****REPAIR****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 38

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	30	20B Blank Added	27	32 - 34	18
3 - 6	23	21 - 23	18	35 - 37	23
7	19	24	24	38 - 40	18
8 - 9	18	25	18	41	19
10	27	26	19	42	18
11 - 20 Deleted	27	27 - 30	18	43 - 44	19
20A Added	27	31	19	45 - 46	27

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Introduction and General Information - - - - -	T.O. 2J-F100-53-1

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
ALCOHOL, DENATURED	O-E-760, TYPE III
ALCOHOL, ISOPROPYL (PMC 9094)	TT-I-735
PRIMER, ADHESIVE (PWA 556)	DC1200
BRUSH, NONMETALLIC, SOFT	H-B-1490/3-T1
CHEESECLOTH, UNSIZED (PWA GA100-11)	CCC-C-440
CLOTH, ABRASIVE, CROCUS	P-C-458
CLOTH, DRY, LINT-FREE	-
CLOTH, EMERY	NORTON CO. 1 NEW BOND ST. WORCESTER, MA 01606 OR CARBORUNDUM CO. P.O. BOX 337 BUFFALO AVE NIAGARA FALLS, NY 14302
GLOVES, NYLON LINT-FREE	STYLE NO. 4312
SEALANT/ADHESIVE/FILLER, SILICONE	DC3120
RUBBER	

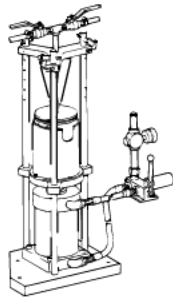
EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
LOCKWIRE (0.032 INCH DIAMETER)	MS9226-04	AS REQUIRED
RIVET	MS9318-100	AS REQUIRED

APPLICABLE SUPPORT EQUIPMENT

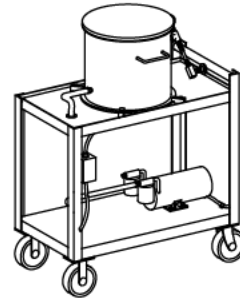
Paragraph	Function - Tool Nomenclature	Tool Number
7	FAN INLET CASE ASSEMBLY - AFT FAIRING REPLACEMENT	
	FIXTURE, MACHINE, CASE, FAN INLET - - - - -	PWA 71098
	FIXTURE, MACHINE, FAN INLET FAIRING DETAIL - - - - -	PWA 71099
	FIXTURE, ELECTRON BEAM WELD, FAN INLET CASE - - - - -	PWA 71100
	FIXTURE, STRESS RELIEF, FAN INLET CASE - - - - -	PWA 71101
	HOLDER, TEST STRIP, FAN INLET CASE - - - - -	PWA 71103
	FIXTURE, SHOTPEEN, FAN INLET CASE - - - - -	PWA 71102
	PEDESTAL, AUTOMATED SHOTPEEN INSTALLATION - - - - -	PWA 70449
	MASK, SHOTPEEN, FAN INLET CASE - - - - -	PWA 71105
	MASK, SHOTPEEN, FAN INLET CASE - - - - -	PWA 71104
8	FAN INLET CASE ASSEMBLY - OIL AND PS2 TUBE REPLACEMENT	
	FIXTURE, BRAZE, CASE, FAN INLET - - - - -	PWA 71106
	GAGE, FLUSH PIN, FAN INLET CASE - - - - -	PWA 71149
	GAGE, FLUSH PIN, FAN INLET CASE - - - - -	PWA 71150
	SET, PRESSURE CHECK, FAN INLET CASE - - - - -	PWA 71108
10	Ps2 HEATER AND QUAD N1 SENSING CABLE ASSEMBLY - REPLACEMENT	
	CRIMPER, CONNECTOR, QUAD N, 1 SENSOR - - - - -	PWA 56649
		OR
	CRIMPER-CONNECTOR, DUAL N1 FLEXIBLE CABLE - - - - -	PWA 55555
12	FAN INLET CASE ASSEMBLY - FAIRING RUBBER REPLACEMENT	
	FIXTURE, MOLD, FIC RUBBER - - - - -	PWA 70804
	VACUUM CHAMBER - - - - -	PWA 34571
	FIXTURE, MOLD, FIC RUBBER - - - - -	PWA 70804
	DISPENSER, RUBBER, COMPRESSOR STATOR AND CASE ASSY	PWA 26443

ILLUSTRATED SUPPORT EQUIPMENT



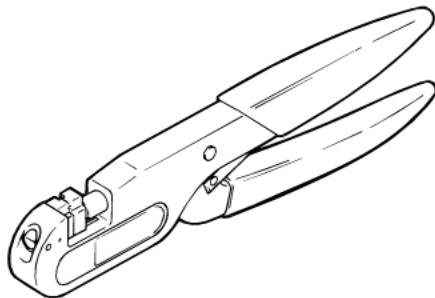
PWA 26443 -C

Figure T1. PWA 26443 DISPENSER



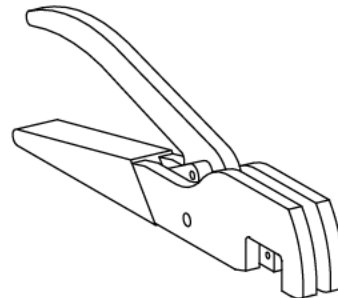
PWA 34571 -C

Figure T2. PWA 34571 VACUUM CHAMBER



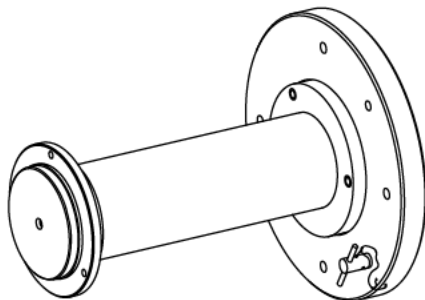
PWA 55555 -C

Figure T3. PWA 55555 CRIMPER-CONNECTOR



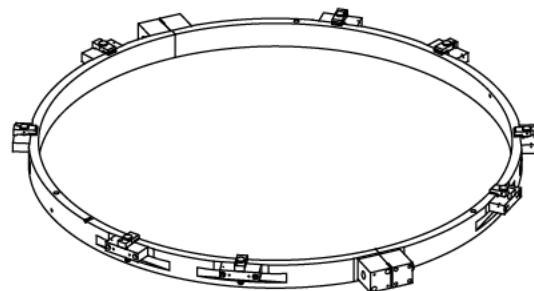
PWA 56649 -C

Figure T4. PWA 56649 CRIMPER



PWA 70449 -C

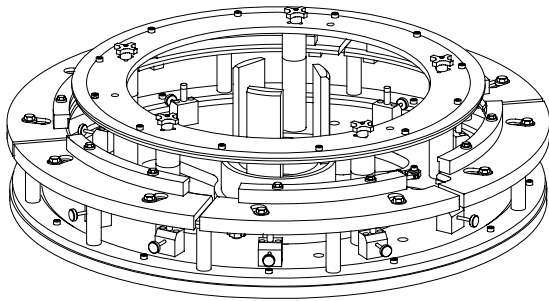
Figure T5. PWA 70449 PEDESTAL



PWA 70804 -C

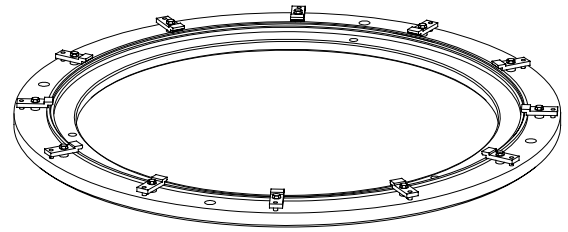
Figure T6. PWA 70804 FIXTURE

ILLUSTRATED SUPPORT EQUIPMENT (continued)



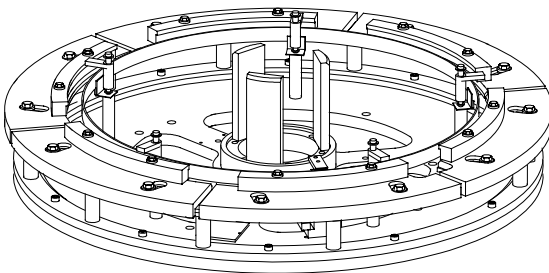
PWA 71098 -C

Figure T7. PWA 71098 FIXTURE



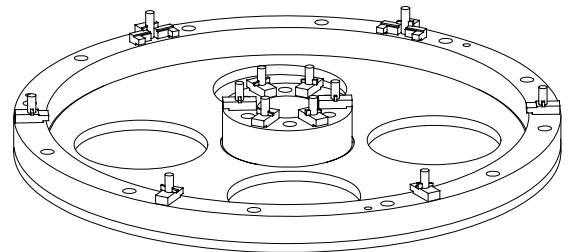
PWA 71099 -C

Figure T8. PWA 71099 FIXTURE



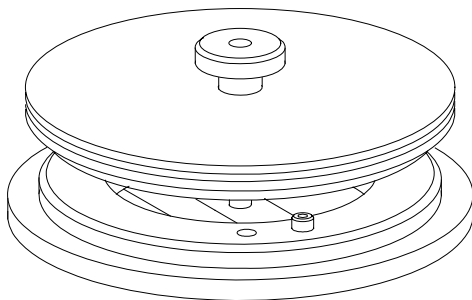
PWA 71100 -C

Figure T9. PWA 71100 FIXTURE



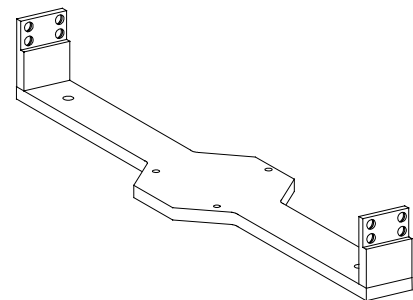
PWA 71101 -C

Figure T10. PWA 71101 FIXTURE



PWA 71102 -C

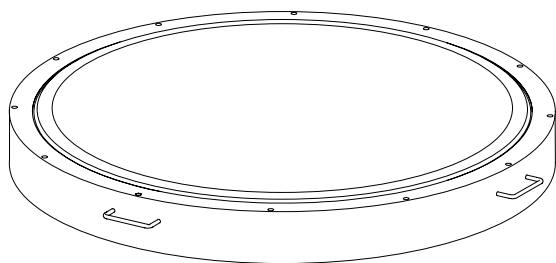
Figure T11. PWA 71102 FIXTURE



PWA 71103 -C

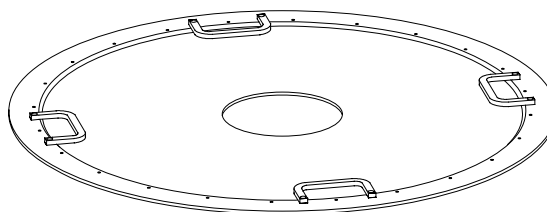
Figure T12. PWA 71103 HOLDER

ILLUSTRATED SUPPORT EQUIPMENT (continued)



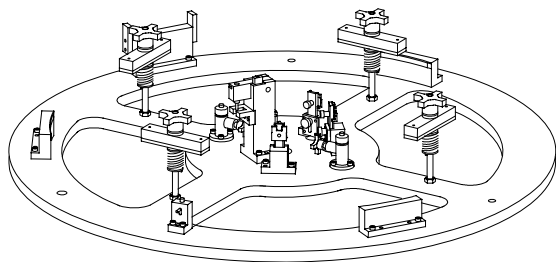
PWA 71104 -C

Figure T13. PWA 71104 MASK



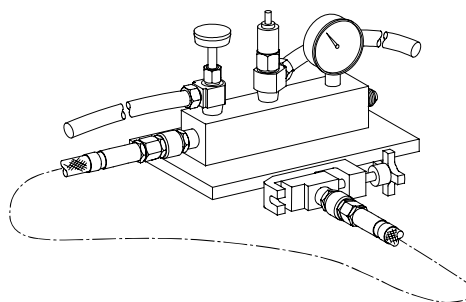
PWA 71105 -C

Figure T14. PWA 71105 MASK



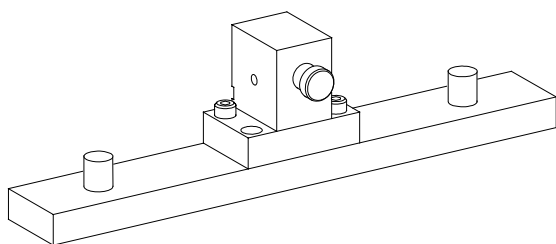
PWA 71106 -C

Figure T15. PWA 71106 FIXTURE



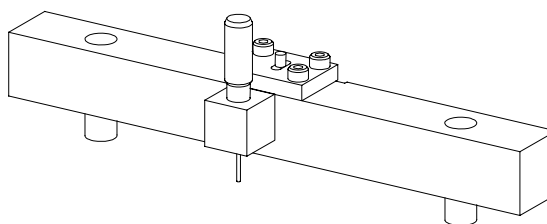
PWA 71108 -C

Figure T16. PWA 71108 SET



PWA 71149 -C

Figure T17. PWA 71149 GAGE



PWA 71150 -C

Figure T18. PWA 71150 GAGE

1. INTRODUCTION.

- a. This work package contains instructions for repair of fan inlet case assembly.

- b. At 1.5 volts DC, check cable insulation resistance. Resistance shall be at least 1 megohm. Use following procedure:

- (1) Check resistance between each cable pin and ground.
- (2) Check resistance between cable pins.

2. FAN INLET CASE ASSEMBLY - SPECIAL QUAD N₁ SENSING CABLE RESISTANCE AND CONTINUITY CHECK.

(See Figures 1, 2, and 3.)

- a. Refer to figure 2 for an example of a typical check sequence and to prevent unnecessary repetition.

- c. Using ohmmeter, check cable continuity. (See figure 3.)

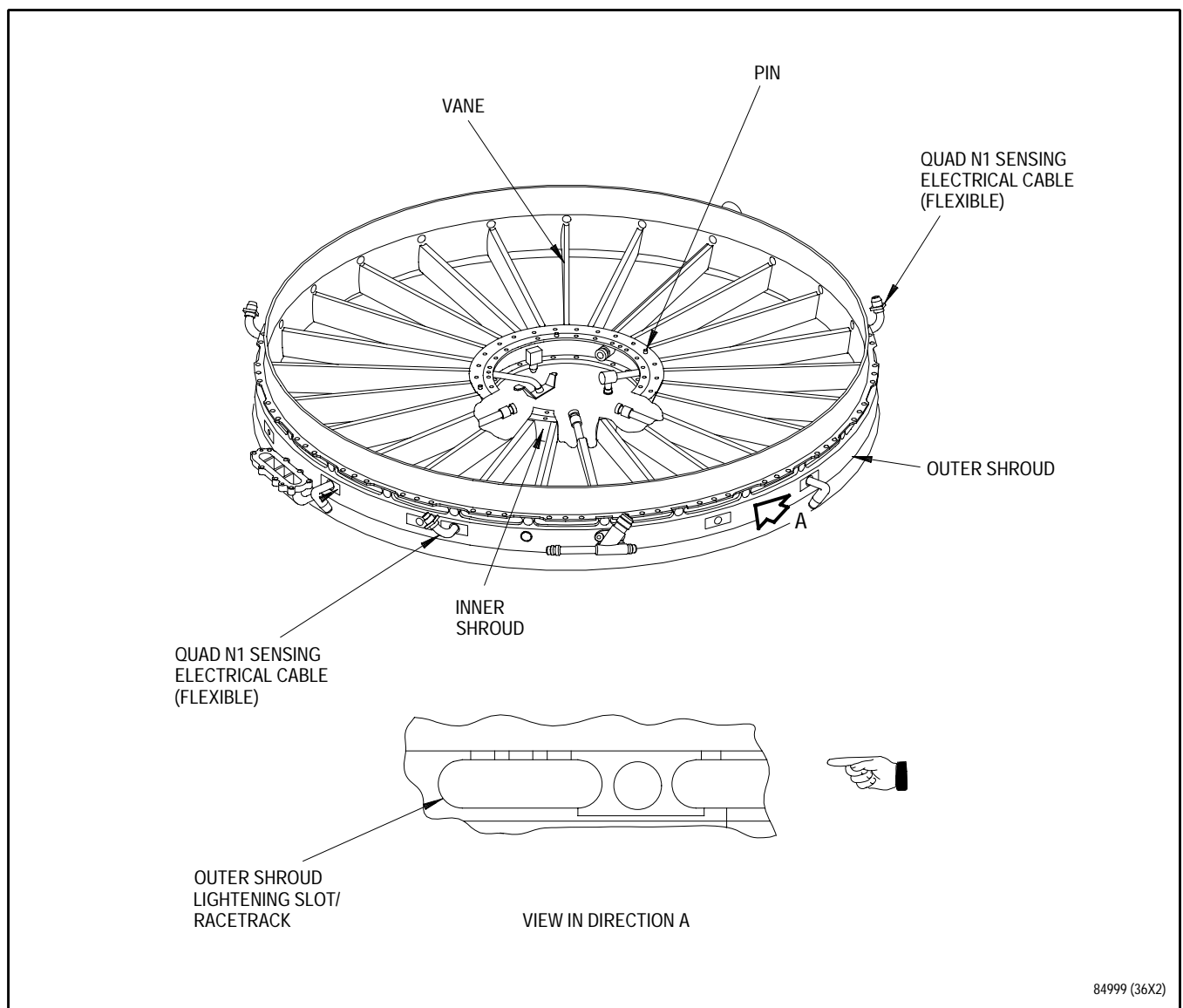


Figure 1. Fan Inlet Case Assembly

84999 (36X2)

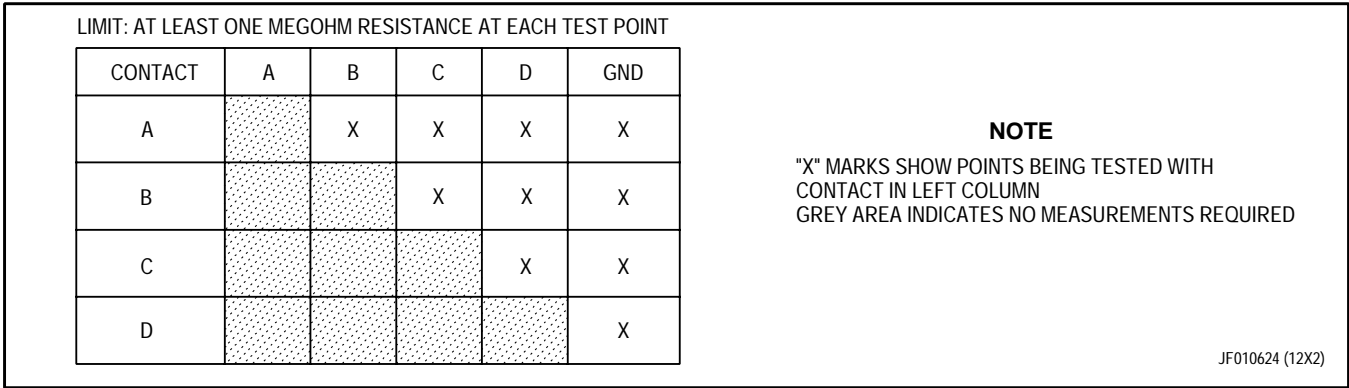


Figure 2. Fan Inlet Case Assembly - Special Quad N₁ Sensing Cable Electrical Cable Insulation Resistance Check

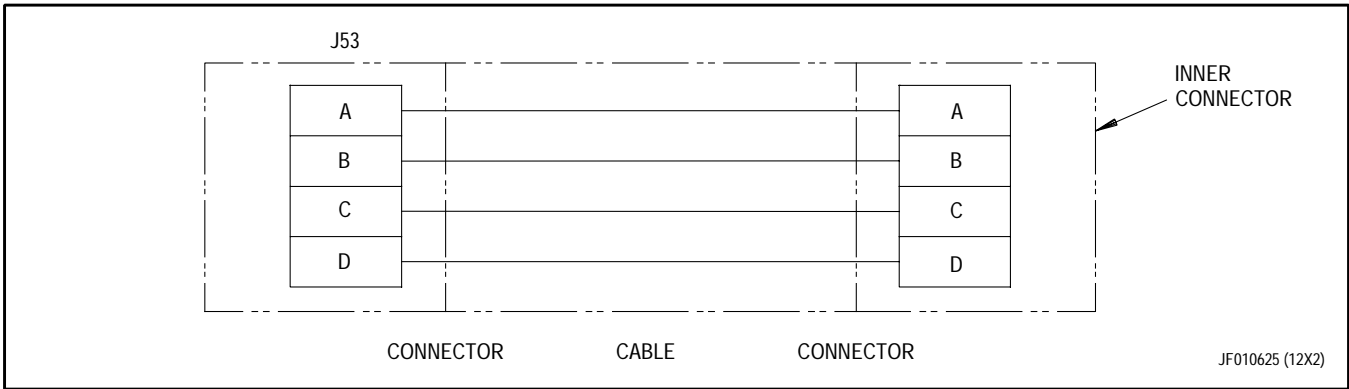


Figure 3. Fan Inlet Case Assembly - Special Quad N₁ Sensing Cable Wiring Schematic

3. SPECIAL QUAD N₁ SENSING CABLE - BENT CONNECTOR PIN REPAIR.

(See Figure 4.)

- a. Straighten slightly bent pins using one of following methods:

- (1) Use mating socket connectors to straighten pin.
- (2) Use a small tube to straighten pin.

- (3) Place a protective plastic sheath over pin and use needle nose pliers to straighten.

- b. If pin shows signs of cracking after straightening, replace cable.

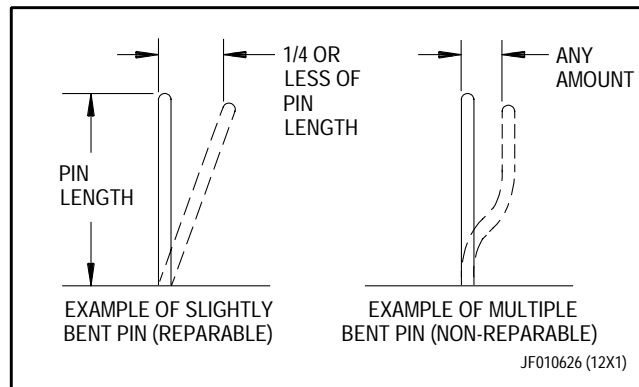


Figure 4. Bent Connector Pin

4. FAN INLET CASE ASSEMBLY - PIN REPLACEMENT.

(See figure 1.)

NOTE

Pins are located in inner shroud rear flange, rear surface.

- a. Remove damaged pin by drifting pin out from front.
- b. Chill replacement pin and install from rear using standard drift.

5. FAN INLET CASE ASSEMBLY - VANE BLEND REPAIR.

(See figure 1.)

- a. Blend repair smooth or round bottom dents (without cracks or tears) to a maximum of 0.020 inch after blend. Remove all sharp edges. Resulting blend shall have a diameter which is a minimum of 15X blend depth. Blending will be accomplished with stones and crocus cloth. Blend will be as smooth or smoother than surrounding area.
- b. Blend repair nicks and scratches on vane to a maximum of 0.010 inch after blend. Remove all sharp edges. Resulting blend shall have a diameter which is a minimum of 15X blend depth. Blending will be accomplished with stones and crocus cloth. Blend will be as smooth or smoother than surrounding area.
- c. Fluorescent penetrant inspect all blend areas. Refer to T.O. 2J-F100-9. No cracks allowed.

6. FAN INLET CASE INNER AND OUTER SHROUD - BLEND REPAIR.

(See figure 1.)

- a. Blend nicks and scratches, any place on inner and outer shroud with sharp indentations. Depth of blend shall be 0.015 inch deep maximum for inner and outer shroud areas, except depth of blend in area immediately around lightening slot/racetrack shall be 0.045 inch deep maximum. Resulting blend shall have a diameter which is a minimum of 15X blend depth. Blending will be accomplished with stones and crocus cloth or files.
- b. Blend surface shall be as smooth or smoother than surrounding parent material.
- c. Fluorescent penetrant inspect blend area. Refer to T.O. 2J-F100-9. No cracks allowed.

7. FAN INLET CASE ASSEMBLY - AFT FAIRING REPLACEMENT.

NOTE

- The Fan Inlet Case Assembly - Aft Fairing Replacement is a Source Demonstration Repair. Send reparable parts to an approved source for repair. An approved source list can be obtained by contacting the cognizant USAF F100 Engineering Source Authority at the address listed in the Qualified Repair Source List (QRSL) located in T.O. 2J-F100-53-1, WP 600 00.
- The critical nature of this repair requires each facility intending to accomplish this repair to contact the F100 Engineering Source Authority at the address listed in the QRSL to obtain information on becoming a source.

Pages 11 through 20, including Figure 5, deleted.

8. FAN INLET CASE ASSEMBLY - OIL AND PS2 TUBE REPLACEMENT.

(See Figure 6.)

- a. Remove oil supply and scavenge tubes from inlet case as follows:



Inlet case can suffer alpha case contamination if temperature limits are exceeded.

- (1) Use adequate insulation to reduce temperature and thermocouples to record temperature around sleeve area. Use of Fiberfrax insulation is recommended.
 - (2) Debraze ID fitting by applying direct heat to oil tube to fitting joint. Torch heating is allowed, provided that inlet case does not exceed 1000°F(538°C).
 - (3) Clean residual braze from ID fitting using crocus cloth and wire brush.
 - (4) Pull remainder of oil tube assembly away from inlet case and discard.
- b. Install oil tube into inlet case as follows:
- (1) Install tube assembly into inlet case. See figure 6 for tube assembly locations.
 - (2) Install and hand tighten bolts to secure tube assembly to inlet case.

NOTE

ID fitting material is AMS 5646 steel. Tube material is AMS 5571 steel.

- (3) Braze ID fittings to oil tubes as follows:

- (a) Prepare PWA 71106 fixture by removing item-29 hand knobs, item-28 washers, and 27 straps from item-38 support studs located at mid diameter of item-1 base. Retract jack assemblies located at center of tool by turning hand knobs counterclockwise. Turn item-35 screw (located at top of item-19 post) to unlock item-33 leaf and permit swing leaf to pivot upward to obtain inlet case clearance. Turn item-3 knurled knobs and item-4 knurled nut to unlock and retract sliding item-6 guide.
- (4) Assemble fan inlet case to PWA 71106 fixture by lowering outer flange rear face onto item-10 locator segments and item-22 plate. Align top of case to TOP on item-1 base, and align anti-ice manifold to LOAD ANTI-ICE MANIFOLD HERE. Ensure that case OD flange rear face is seated on item-10 locator segments and in clearance relief of item-22 plate.
- (5) Turn item-31 jack assemblies until they contact and support rear vane platforms.
- (6) Assemble item-27 clamps, washers, and item-29 hand knobs onto item-38 studs located at mid diameter of item-1 base.
- (7) Secure item-27 clamps in position by tightening item-29 knobs. Ensure that nylon pad attached to underside of item-27 clamp straddles and contacts vane airfoil leading edge.

- (8) Assemble four straight connectors to the four locators at center of item-1 base. Slide four item-6 guides against underside of straight fittings and lock in position by tightening item-3 knurled knobs and item-4 knurled nuts to lock item-6 guides to fittings.
 - (9) Assemble elbow in tube end with opening in elbow up and through locator slot of item-32 guide. Swing item-33 leaf, located on taller support, down and lock in position with half turn screw. Slide pin into elbow opening.
 - (10) Slide PWA 71107 heat shield under elbow connector with OD step of heat shield resting on rear vane platform front face.
 - (11) Braze ID fittings to oil tubes using AMS 2664 as follows: Refer to T.O. 2J-F100-53-1, SWP 094 01.
 - (12) Remove tooling.
- c. Inspect positioning of tube endings having a straight fitting, using PWA 71149 gage. Retract item-3 flush pin and position item-1 body across case ID with item-3 flush pin conical end facing tube fitting opening. Push item-3 flush pin forward to engage tube end fitting. Reading of stepped end of item-3 flush pin must be flush or below inner step but not below outer step.
- d. Inspect positioning of tube endings having an elbow, using PWA 71150 gage. Retract item-6 gage pin. Position item-1 body across case ID, aligning item-6 gage pin to elbow. Slide item-2 flush pin inward or outward to align item-6 gage pin to center of elbow opening. Push item-6 into elbow opening to lock item-2 flush pin in measurement position. Reading of stepped end of item-2 flush pin shall be flush or below inner step but not below outer step.
- e. Set up PWA 71108 pressure check set to pressure test brazed tubes as follows:
- (1) Attach item-27 hose to item-22 connector at item-20 manifold outlet by coupling quick connect item-23 connector at end of item-27 hose.
 - (2) For tubes having straight inboard connector end, install tooling:
 - (a) Remove item-15 block from storage container (contains item-14 clamp, item-16 plug, item-28 collar, item-18 hand knob, and item-22 inlet fitting assembled to it.)
 - (b) Position radius cutout of item-15 block to fit over straight end connector innermost flange.
 - (c) Turn item-18 hand knob to slide item-28 collar over connector that will guide item-16 plug OD to seal against connector opening providing an inlet passageway to tube.

- (3) For tubes having an elbow, install tooling:

- (a) Remove item-5 adapter, having item-22 male connector threaded to it, from storage.

- (b) Thread item-5 adapter onto threads of elbow at tube inner end.

- (4) For all tubes, select caps to seal off outer elbow or connectors on outside of fan inlet case of tube being tested. Three thread sizes are provided: item-3 cap has 0.5625-18UNJF-3B thread, item-4 cap has 0.4375-20-UNJF-3B thread, and item-19 cap has 0.8750-14-UNJF-3B thread.

f. Pressure test tubes using PWA 71108 pressure check set as follows:

- (1) Close item-11 needle valve at top of manifold.
- (2) Couple quick-connect item-23 connector at end of item-27

hose to inlet fitting of straight connector or elbow of tube to be checked.

- (3) Seal outer tube connectors and elbows by threading item-3, -4, or -19 caps as required on connectors/ elbows. Do not fully seat caps until bleeding air from system.

- (4) Connect water supply to item-26 inlet adapter at end of item-20 manifold.

- (5) Slowly open item-11 needle valve to introduce water to tube while observing item-13 gauge to assure that water pressure is not exceeded.

- (6) Observe outer tube caps until water leaks from cap. Tighten caps.

- (7) Pressure test oil tubes to 175 psi. Pressure test Ps2 tube to 50 to 55 psi.

Legend for figure 6

1. PN 4082267-01 tube assembly
2. PN 4082266-01 tube assembly
3. PN 4082269-01 tube assembly
4. PN 4082271-01 tube assembly
5. PN 4082270-01 tube assembly
6. Bolt, 2 places per tube assembly
7. 0.677 inch reference, 4 places
8. 3.830 to 3.870 inches to axis of Diameter -B-, regardless of feature size, 4 places. Dimension applies only when OD fitting surface K is flush with boss Surface H.
9. Assemble oil tube into ID fitting so that maximum gap is 0.060 inch, 4 places.
10. 0.500 inch minimum, 4 places. ID fitting must slide freely over this distance before installing bolts at OD fitting.
11. Assemble oil tube into ID fitting so that maximum gap is 0.060 inch.
12. 3.910 to 3.950 inches to axis of Diameter -B-, regardless of feature size. Dimension applies only when OD fitting surface K is flush with boss Surface H.

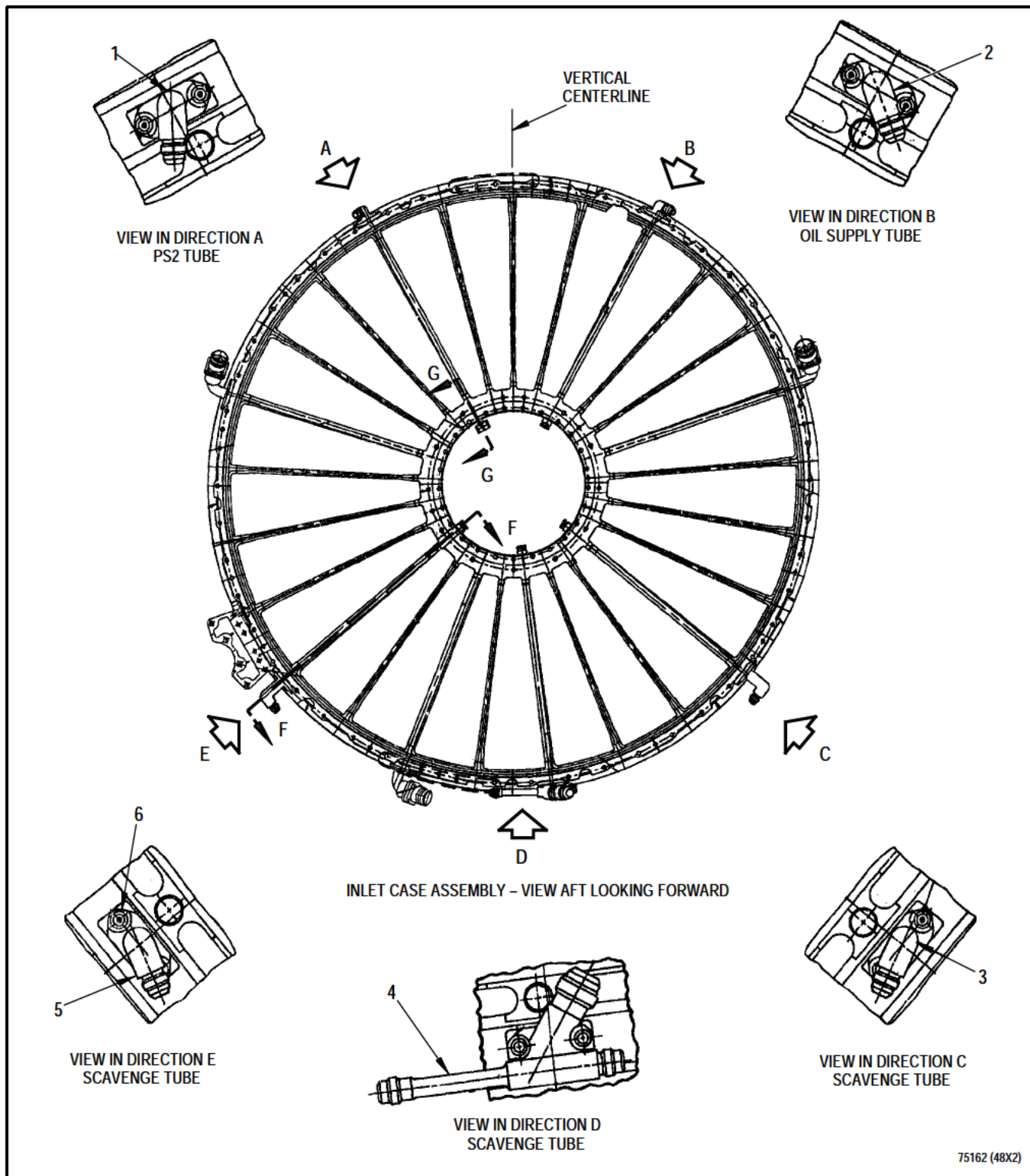
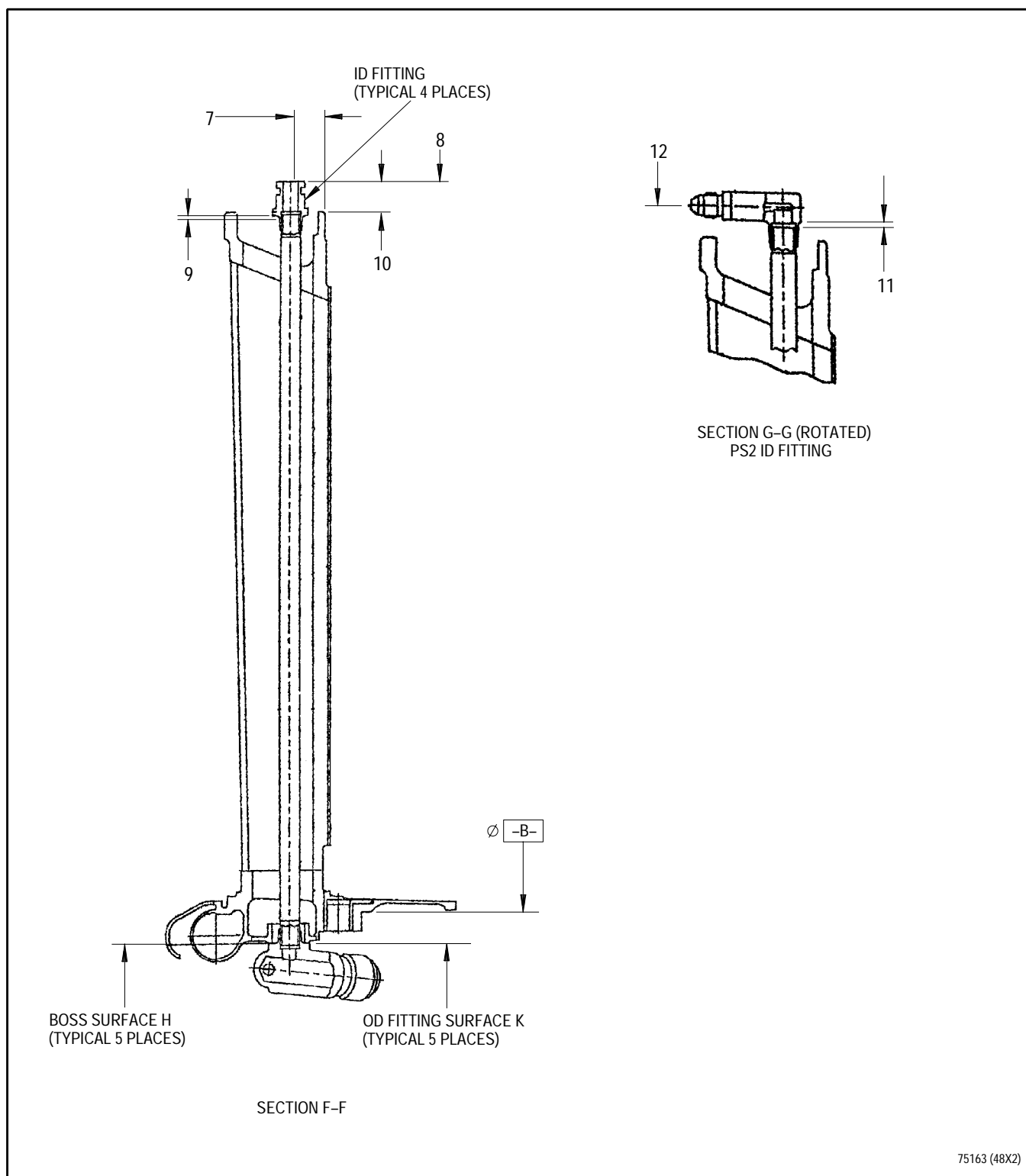


Figure 6. Fan Inlet Case - Oil Tube Replacement (Sheet 1 of 2)

**Figure 6. Fan Inlet Case - Oil Tube Replacement (Sheet 2 of 2)**

9. FAN INLET CASE ASSEMBLY - KEYED STUD AND INSERT REPLACEMENT.

(See Figure 7.)

NOTE

Key inserts feature hardened key mounted in slot broached into parent material at original manufacture, providing positive mechanical lock against vibration.

- a. Surface of work shall be perpendicular to drill. Use level or square on work, if possible, if part is mounted on base of drill press. This will ensure that equal amount of material is removed from behind all keys

- al. Remove key before attempting to remove insert with E-Z out or extractor-type tool. Remove keyed studs as follows:

- (1) Cut off nut end of stud approximately 0.250 inch above inlet case surface.
- (2) Locate center of protruding stud using locally manufactured drill bushing.

NOTE

Use of cutting oil and cobalt drill bit are recommended for drilling operations.

- (3) Drill pilot hole 0.089 inch diameter and 0.100 inch depth.
- (4) Remove locally fabricated drill bushing.
- (5) Drill remaining stud material. Remove material between keys to 0.191 inch diameter.



Exercise care when breaking off tabs. Sharp point punch may damage threads.

- (6) Deflect tabs inward and break off. Use sharp point

punch or other suitable item.

- (7) Remove stud or insert remains by turning counter-clockwise with locally fabricated tooling suitable for removing 0.190 inch diameter inserts.

- (8) Discard stud.

- b. Install keyed studs as follows:

- (1) Mark part surface where one of keys has broached threaded hole. Refer to T.O. 2-1-111.
- (2) Screw new keyed stud into inlet case.
- (3) Align keys with mark that was previously made while ensuring stud end thread is 0.000 to 0.030 inch below inlet case surface.
- (4) Drive keys into inlet case. If resistance is encountered while driving in keys, keys have not been properly aligned with broaches in new threads.

- c. Remove keyed insert as follows:

NOTE

Use of cutting oil and cobalt bit are recommended for drilling operations.

- (1) Center drill bit on insert and drill hole 0.281 inch diameter and 0.160 inch depth.



Exercise care when breaking off tabs. Sharp point punch may damage threads.

- (2) Deflect tabs inward and break off. Use sharp point punch or other suitable item.

- (3) Remove insert remains by turning counter-clockwise with locally fabricated tooling suitable for removing 0.190 inch diameter inserts.
 - (4) Discard stud.
- d. Install keyed inserts as follows:
- (1) Mark part surface where one of keys has broached threaded hole. Refer to T.O. 2-1-111.
 - (2) Screw new keyed insert into inlet case.
 - (3) Align keys with mark that was previously made while ensuring insert end thread is 0.000 to 0.030 inch below inlet case surface.
 - (4) Drive keys into inlet case. If resistance is encountered while driving in keys, keys have not been properly aligned with broaches in new threads.
- e. Inspect insert as follows:
- (1) Keys shall be flush or below part surface.
 - (2) Keys cannot be bent or mushroomed. If so, replace with new insert.

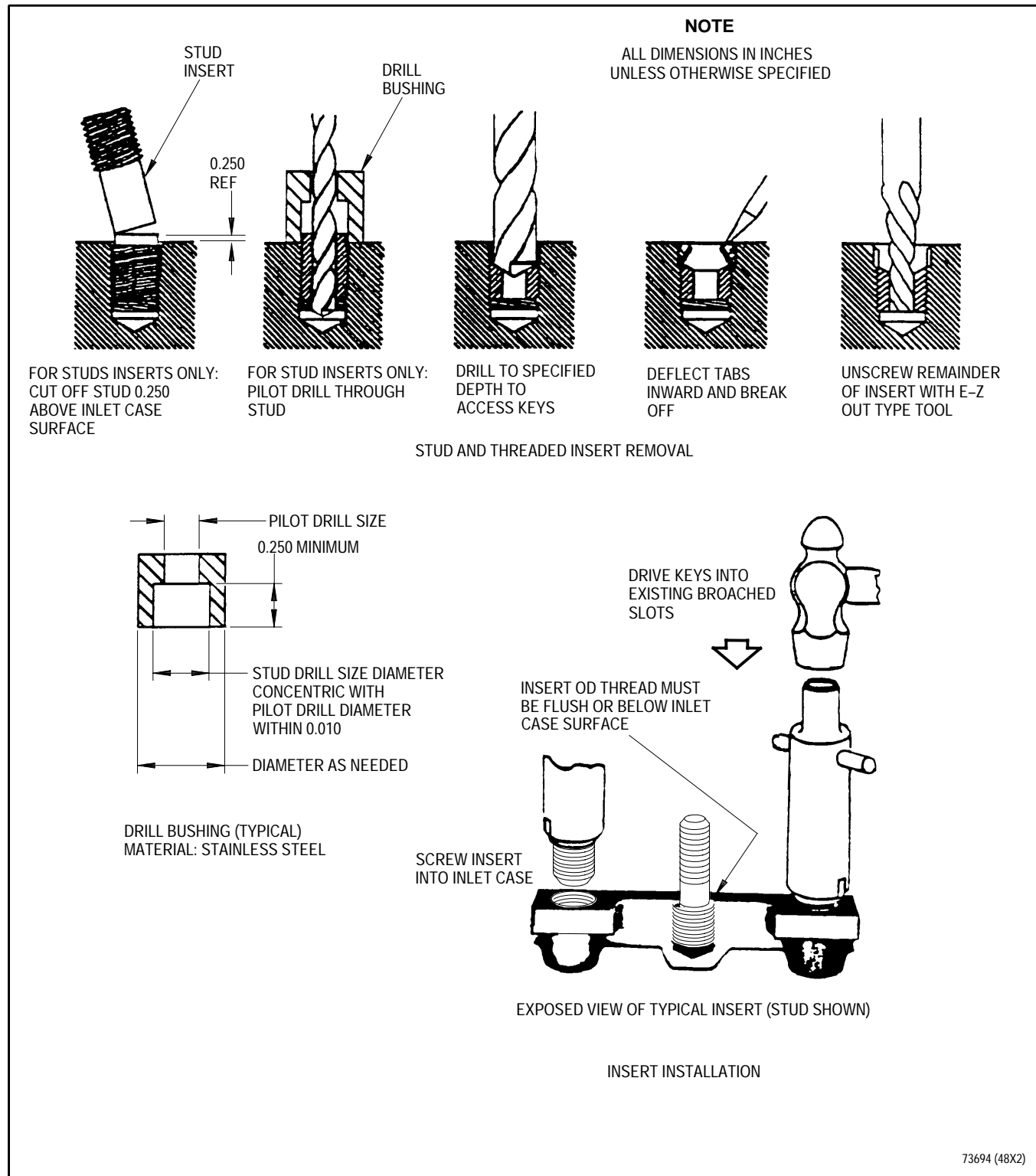


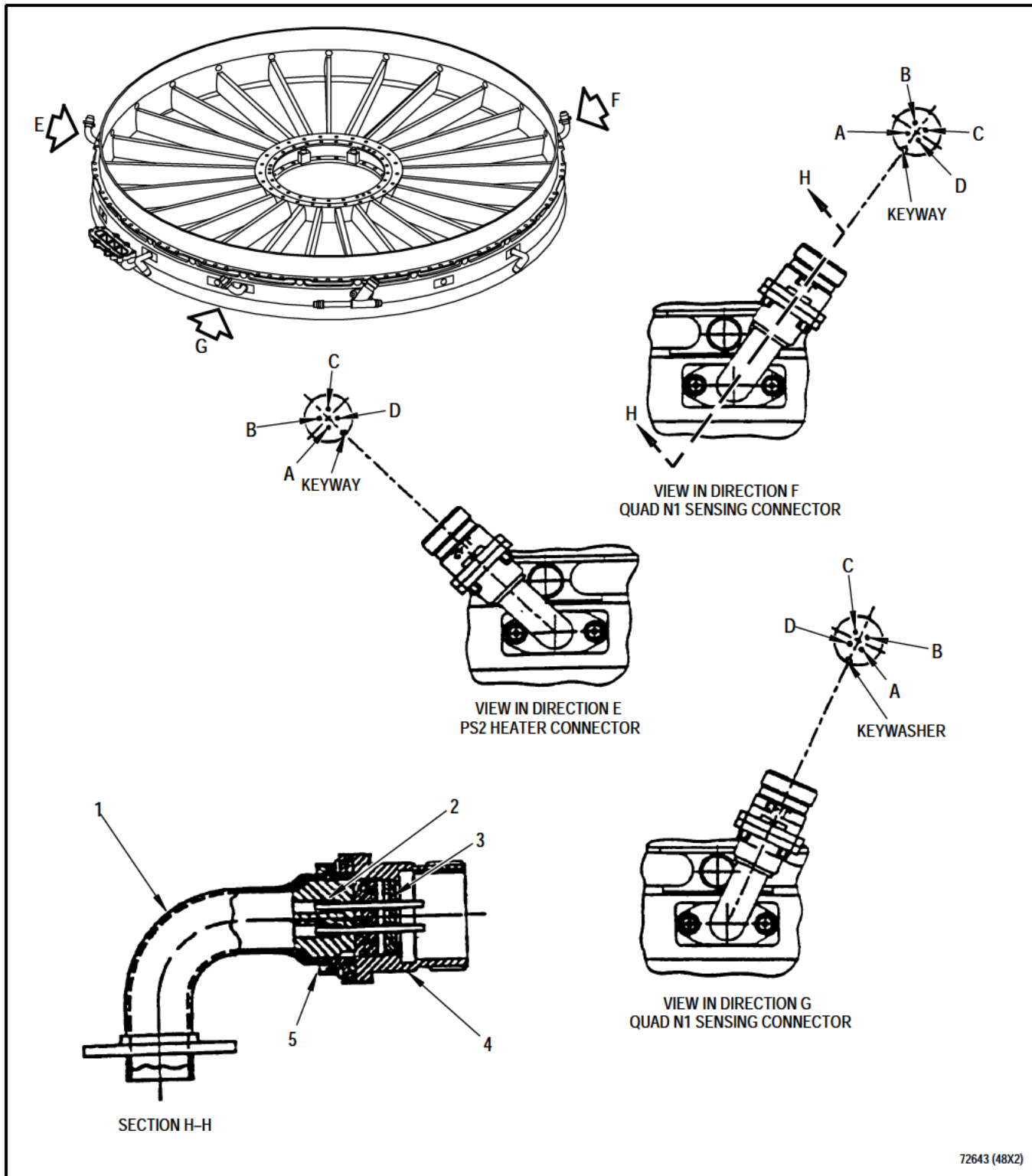
Figure 7. Keyed Stud and Threaded Insert - Replacement

10. Ps2 HEATER AND QUAD N1 SENSING CABLE ASSEMBLY - REPLACEMENT.

(See Figures 8 through 11.)

NOTE

- This procedure describes removal of an unserviceable quad N1 sensing or Ps2 electrical cable and installation of replacement cables. If cable is still serviceable, refer to paragraph 11 for special instructions on outer electrical connector replacement.
 - If Ps2 cable assembly needs replacement, proceed to step b.
- a. Remove quad N1 connector assembly and cable from fan inlet case as follows:
 - (1) Remove two bolts securing connector assembly to inlet case.
 - (2) Grasp outer connector with one hand and pull connector away from inlet case enough so cable can be cut.
 - (3) Hold connector and remove it by cutting cable near connector.
 - (4) Pull remaining cable back through vane segment on ID of inlet case.
 - b. Remove Ps2 connector assembly and cable from fan/inlet case as follows:
 - (1) Remove two bolts securing connector assembly to inlet case.
 - (2) Grasp outer connector with one hand and pull connector away from inlet case enough so cable can be cut.
 - (3) Hold connector and remove it by cutting cable near connector.
 - (4) Pull remaining cable back through case vane segment on ID of inlet case.
 - c. Remove Ps2 cable from bracket as follows:
 - (1) Using a No. 31 drill, remove rivets securing Ps2 cable (see figure 9) to cable bracket and separate bracket from cable. Keep bracket for use with new Ps2 cable.
 - (2) Align Ps2 ID connector major key slot and install cable bracket onto new Ps2 connector with four PN MS9318-100 rivets. Refer to figure 9 and T.O. 2-1-111.
 - d. Disassemble connector assembly as follows:
 - (1) Remove four screws(5, figure 8).
 - (2) Pull shell assembly(4) from connector.
 - (3) Pull insulator assembly(3) and attached cable lead wire, and grommet(2) from connector.
 - (4) Discard insulator assembly(3) with attached lead wires and keep grommet(2).
 - e. Deburr and polish back shell assembly(1) if necessary. Ensure elbow area, where excess weld occurs, is free of sharp edges.
 - f. Check vane ID at both ends for sharp edges or burrs. Deburr and polish ID of vane, if necessary, taking care not to remove parent material of vane.
 - g. Insert piece of PN MS9226-04 lockwire through inlet case OD boss until lockwire protrudes above vane segment ID.



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Figure 8. Fan Inlet Case - Quad N1 Sensing and Ps2 Connector and Cable Assemblies Replacement

Legend for figure 8

1. Back shell assembly
2. Grommet
3. Insulator assembly
4. Shell assembly
5. Screws

NOTE

- Long lead wires are used to pull thicker wire sections through inlet case vane segment.
 - Teflon sleeving protects fiberglass insulation on letter coded lead wires.
- h. Using lockwire previously installed through vane, bend four individual leads into a hook and loop over end of lockwire. Pull lead wires(4, figure 10) through vane segment until round overbraid sock(6) contacts vane segment ID. Do not twist or cross wires for entire length of vane segment. Ensure cable assembly can be moved back and forth freely with approximately 2 inches of travel.
 - i. Feed lead wires through back shell assembly(1, figure 8) and seat back shell assembly, facing rearward, on inlet case. Remove tape from lead wire bunch. Remove lockwire.
 - j. Position tapered end of grommet toward backshell assembly flange and feed lead wires through grommet(2). Align letter coded lead wires A and D (figure 8) away from inlet case and wires B and C closest to inlet case.

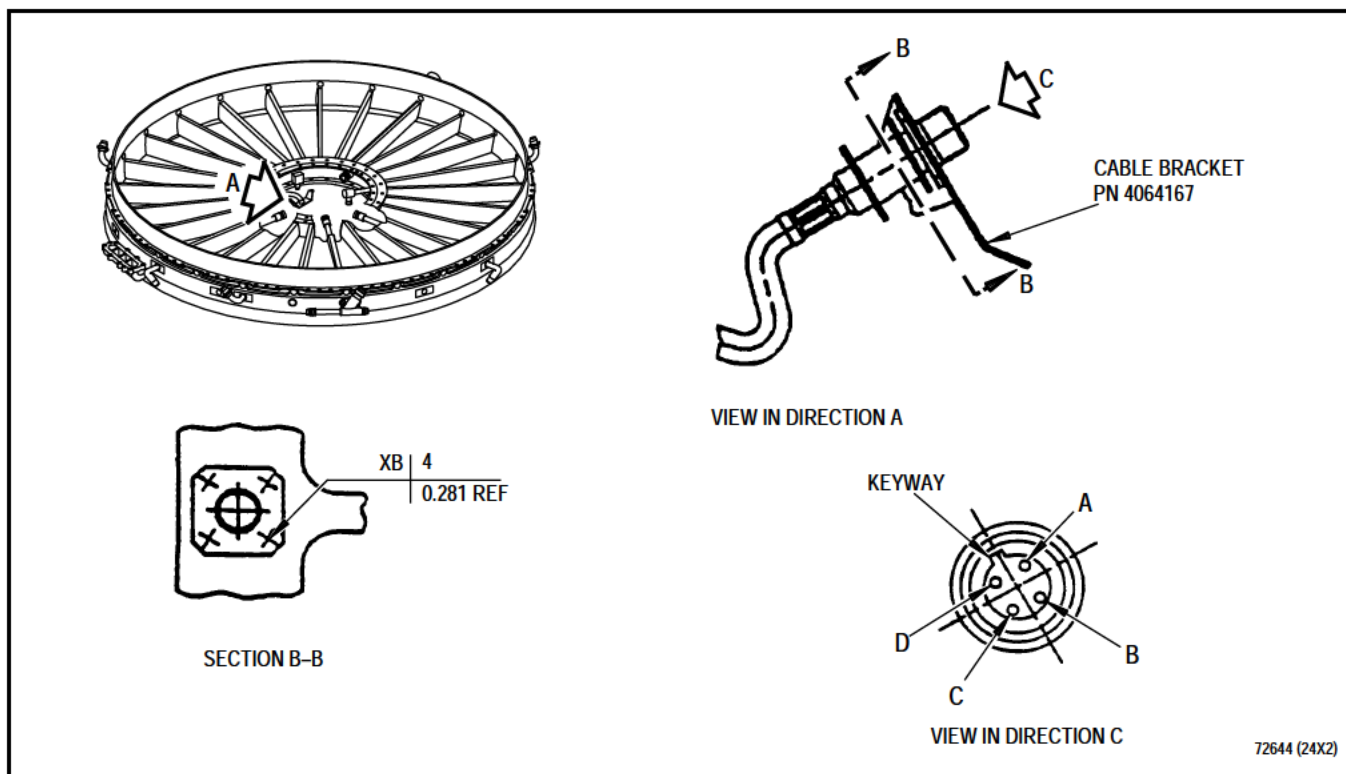
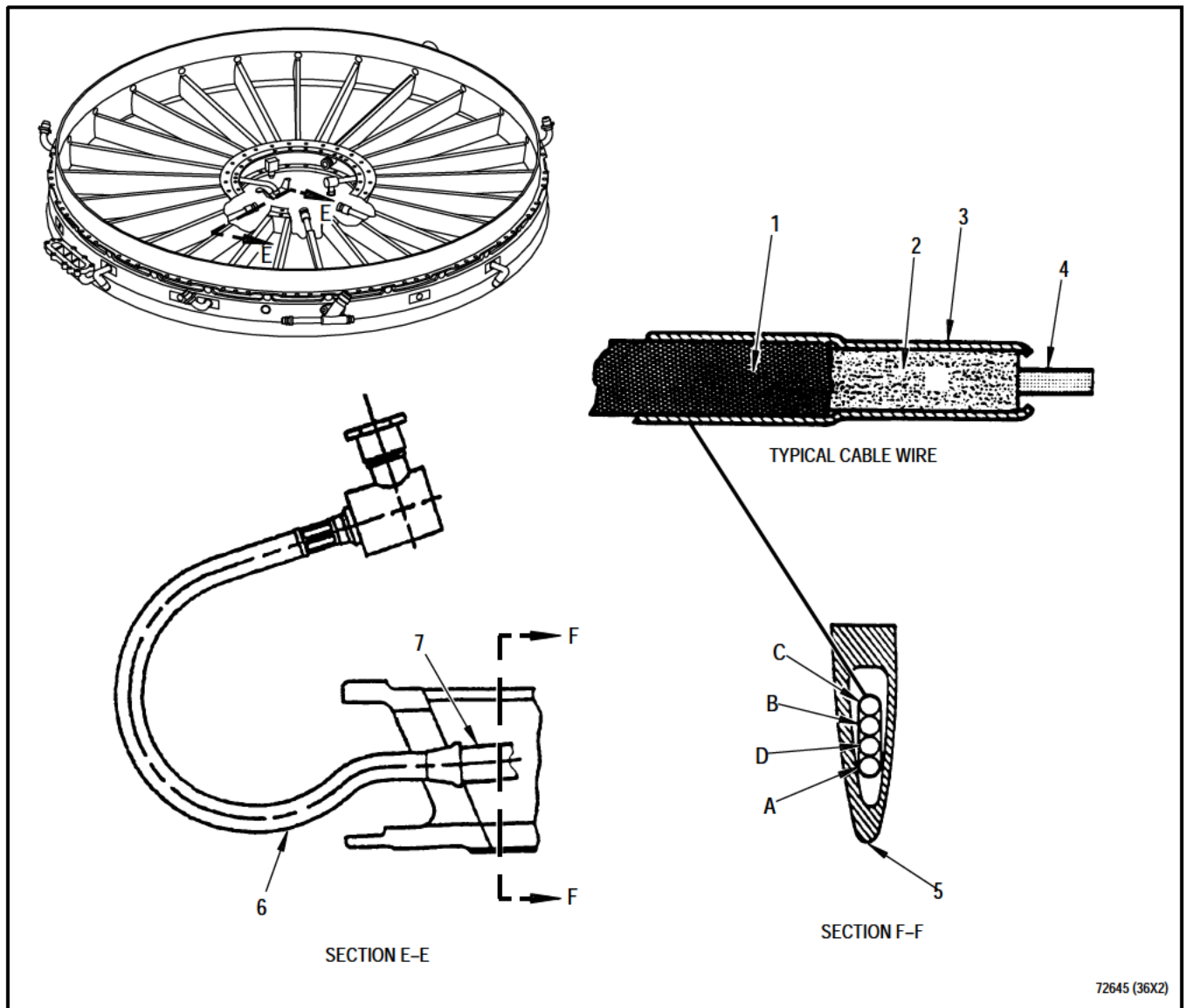


Figure 9. Ps2 Cable Bracket - Installation



1. Metal braid
2. Letter coded lead wire (fiberglass insulated)
3. Teflon sleeving
4. Lead wire
5. Inlet case strut leading edge
6. Round metal overbraid sock
7. Flat metal overbraid

Figure 10. Lead Wire Alignment

k. Install cable wires in insulator assembly as follows:

(1) Cut wires at angle shown in figure 11, Sheet 1.

(a) Strip 0.250 to 0.300 inch insulation from end of each wire.

(b) Trim back any Teflon sleeving which extends beyond fiberglass insulation.

(2) Using a small piece of wire, check insulator assembly pin sockets for blockage, up to 0.250 inch deep minimum. See Sheet 2.

(a) If any socket is blocked, obtain new insulator assembly.

(b) Bevel ID of pin sockets to ease lead wire installation.

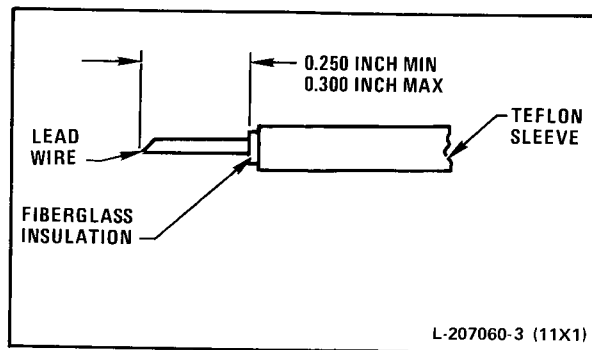


Figure 11. Installation of Lead Wires Into Insulator Assembly (Sheet 1 of 6)

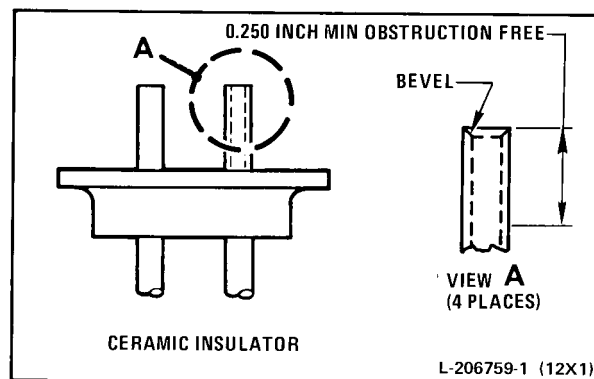


Figure 11. Installation of Lead Wires Into Insulator Assembly (Sheet 2 of 6)

NOTE

Rear face of insulator assembly has letter designations for each pin.

- (3) Letter coded lead wires align with corresponding pins. Insert shortest lead wire into socket portion of pin with corresponding letter, to a depth of 0.250 to 0.300 inch. See Sheet 3.

- (a) Maintain 0.050 inch maximum gap between fiberglass insulation and rear face of pin.

- (4) Using PWA 56649 crimper, crimp each socket to secure wire as follows:

- (a) Open crimper to accept insulator assembly(1, Sheet 4). Die surface(2) shall rest against back of insulator assembly.
- (b) Squeeze crimper 3 to 4 times to achieve full crimp, followed by very firm squeeze to release ratchet. See Sheet 5.
- (c) Rotate crimper 90 degrees to each position and crimp remaining wires. See Sheet 6.

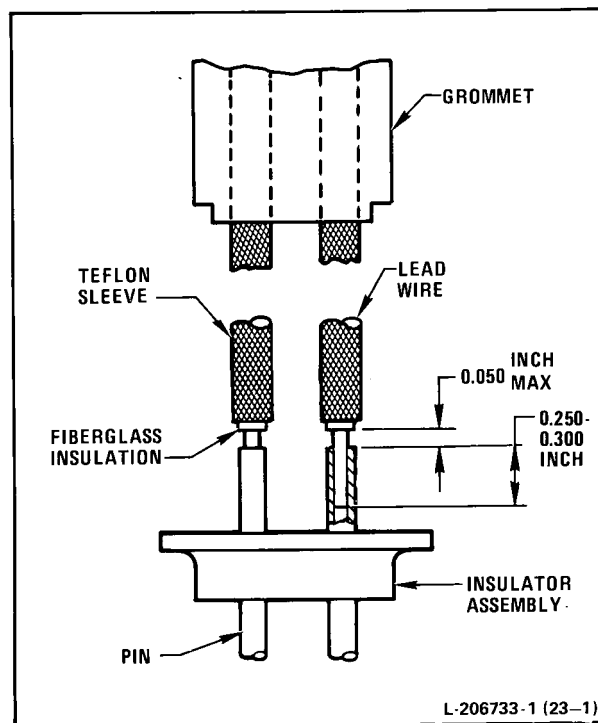


Figure 11. Installation of Lead Wires Into Insulator Assembly (Sheet 3 of 6)

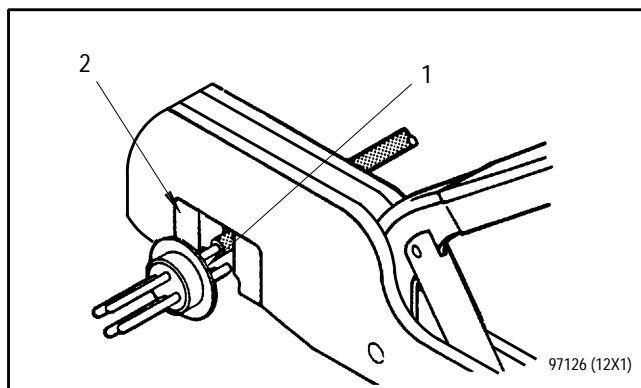


Figure 11. Installation of Lead Wires Into Insulator Assembly (Sheet 4 of 6)

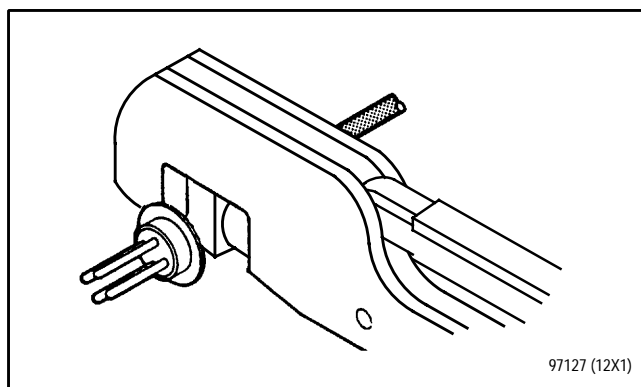


Figure 11. Installation of Lead Wires Into Insulator Assembly (Sheet 5 of 6)

1. After crimping, proceed as follows:

- (1) Using long nose pliers, tug each wire to make sure it has been crimped securely.



Individual wire strands may separate from wire bunch during installation into insulator assembly. If these wires are not trimmed, shorts may occur.

- (2) Trim stray wire strands flush with fiberglass

insulation using diagonal cutter or scissors.

- (3) Inspect alignment between front pins and rear sockets on insulator assembly. If necessary, repair bent connector pins per paragraph 3.
- (4) Slide rubber grommet over sockets on insulator assembly.

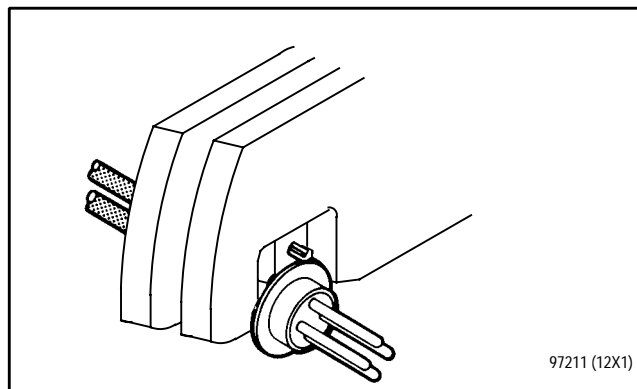


Figure 11. Installation of Lead Wires Into Insulator Assembly (Sheet 6 of 6)

- m. Perform resistance and continuity check per WP 310 00. If check fails, slide back grommet and recrimp any loose wires. If check fails after recrimping, remove cable assembly and proceed as follows:

- (1) Check removed cable for cutting or fraying due to sharp metal edges. Deburr and polish vane segment and back shell assembly, as required.
- (2) Repeat replacement procedure using new cable assembly.

NOTE

- Grommet(2, figure 8) should have snug fit with back shell assembly(1), and insulator assembly(3) should fit flush to rear face of back shell assembly.
 - Flat pull strap at end of cable flat metal overbraid fits between grommet and back shell to provide cable retention at OD connector.
- n. Take up slack from back shell assembly by pulling cable wires back through vane segment ID

with one hand. Hold flat pull strap against side of grommet and install grommet in back shell. Flat pull strap should not extend past end of grommet after installation.

NOTE

- Front face of insulator assembly has black dot which aligns with black dot on shell assembly(4).
 - Major key slot must be located as shown for correct alignment. (See figure 8.)
- o. Mate shell assembly to back shell assembly. Secure using four screws(5). Torque four screws 10 to 12 pound-inches.
- p. Secure connector assembly with two bolts. Torque 27 to 30 pound-inches.
- q. Perform resistance and continuity check per WP 310 00. If check fails, see step m.
- r. Lockwire four screws.
- s. Cap openings and secure cable to ID of fan inlet case per WP 005 00.

11. QUAD N1 AND Ps2 HEATER ELECTRICAL CONNECTOR - REPLACEMENT. (WHEN ELECTRICAL CABLE IS TO BE REUSED.)

(See figures 8 and 11, and Figure 12.)

- a. Remove bolts securing OD connector to inlet case.
- b. Remove four screws(5, figure 8) securing connector back shell to connector front shell.
- c. Remove connector front shell.
- d. Grasp OD connector and move connector away from inlet case.
- e. Remove connector back shell as follows:
 - (1) Slide connector back shell over lead wires to expose grommet and insulator assembly.
 - (2) Move grommet away from insulator.
 - (3) Using small three corner hand file, carefully file away socket material in area of crimp until lead wire is exposed and crimp compression is released. See figure 12.
 - (4) Carefully pull lead wire out of filed socket.
 - (5) Repeat step e. (2) and (3) for the other three lead wires.
 - (6) Discard insulator(3, figure 8).
 - (7) Remove connector back shell.
- f. Prepare cable lead wires for installation into new electrical connector as follows:
 - (1) Inspect ends of all four lead wires.
 - (a) If no more than half of the wires on any one lead are damaged, make sure that the end of each lead conforms with figure 11, Sheet 1.
 - (b) If any one lead has more than half its wires damaged, cut the wires of all four leads at the end of the insulation. Strip off 0.250 to 0.300 inch of insulation. See figure 11, Sheet 1. Reidentify each lead if identification was removed.
- g. Install new electrical connector per paragraph 10.

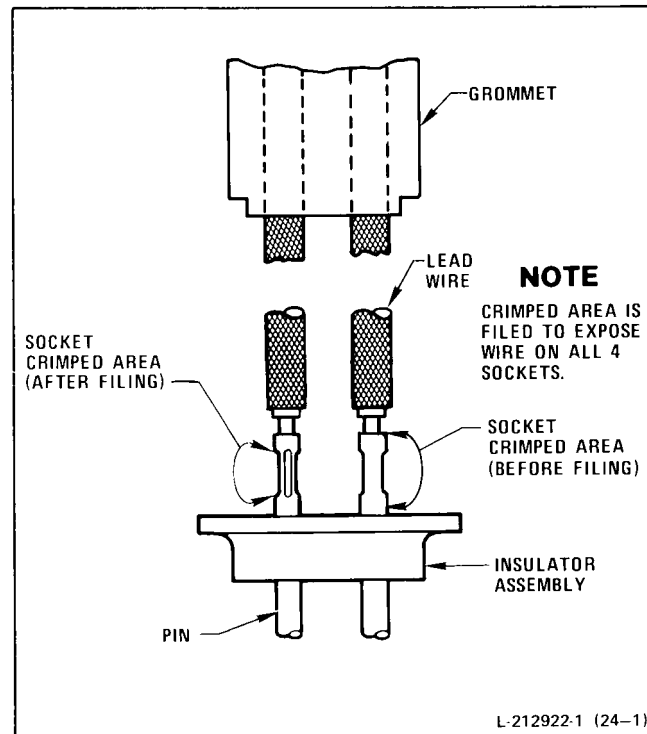


Figure 12. Quad N1 and Ps2 Heater Electrical Connector - Replacement

12. Fan Inlet Case Assembly - Fairing Rubber Replacement.

(See Figures 13, 14, and 15.)

- Remove bolts on electrical connectors and rotate as required to provide clearance for PWA 70804 fixture.
- Place inlet case with aft end facing up.
- Scrape rubber off inlet case using locally manufactured non-metallic scraper.
- Clean and visually inspect aft 1/2 inch of case fairing for cracks, using bright light, and paying particular attention to trailing edge. Inspect both OD and ID. No cracks allowed.

- Roughen area to be primed on inlet case using 180 to 280 grit emery cloth. Blow area clean using dry nitrogen or brush clean.

NOTE

Cheesecloth shall be changed frequently.

- Clean area to be molded using clean cheesecloth dampened with denatured alcohol until cheesecloth appears clean and all evidence of residue has been removed. Blow dry using dry clean nitrogen or brush clean.

NOTE

Silicone rubber shall be applied no sooner than 2 hours and no later than 24 hours of primer application and within 30 minutes after mixing in curing agent.

- g. Apply DC-1200 primer, PWA 556 or Visilox-06, to area to be molded with silicon rubber. Apply thin dry film of primer with clean brush in a single application. Do not allow primer to run during application. Allow primer to dry for a minimum of 2 hours before applying silicone rubber. Do not touch primed surface.
(See figure 13.)

NOTE

Catalyst is not added at this time.

- h. Place contents of three cans of silicone rubber, DC3120, in clean container approximately four times the volume of silicone rubber.
- i. Place container with silicone rubber in PWA 34571 vacuum chamber for minimum of 2 hours at a vacuum of 25 inches Hg or better.
- j. Clean PWA 70804 fixture using clean cheesecloth dampened with denatured alcohol. Do not touch teflon surface of fixture after cleaning.
- k. Wearing clean, lint free gloves while handling fixture, place PWA 70804 fixture on table with retainers facing up. Loosely assemble fixture and remove plugs from injection and vent port fittings. (See figure 14.)

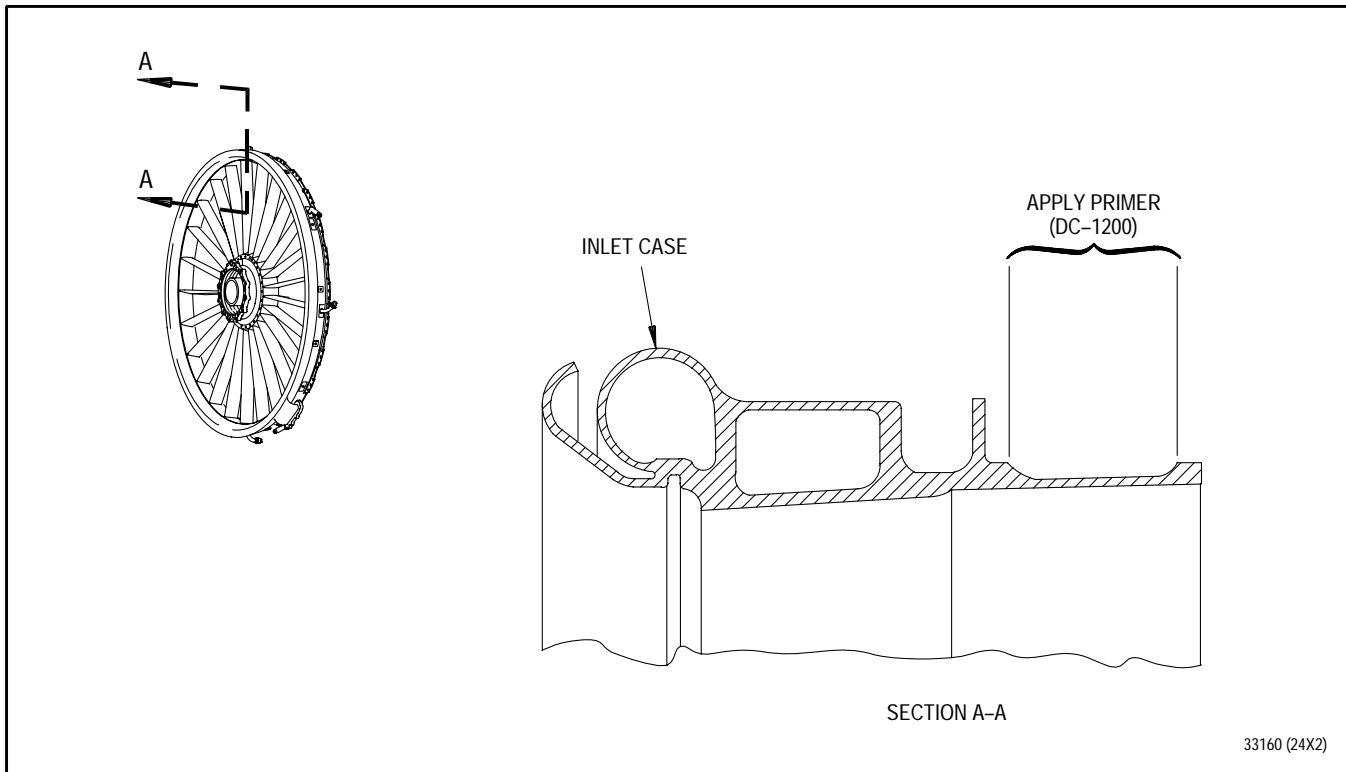


Figure 13. Fan Inlet Case Fairing - Primer application

- l. Visually verify that primer is pink in area to be molded in inlet case.
- m. Check O-rings for nicks, cuts, gouges, and positioning in fixture. Correct condition or replace O-ring, if required.



Use care when lowering inlet case fairing into PWA 70804 fixture to prevent damage to O-rings.

- n. Aligning pin in flange of inlet case with slot in fixture,

install case, aft end down, in PWA 70804 fixture.

- o. Position inlet case by installing eight retainers over inlet case flange. If required, loosen block clamps.
- p. Tighten two shoulder bolts on fixture halves equally to draw fixture halves together.
- q. Secure clamps by adjusting hex nuts. Torque all bolts 55 to 65 pound-inches. (See figure 14.)

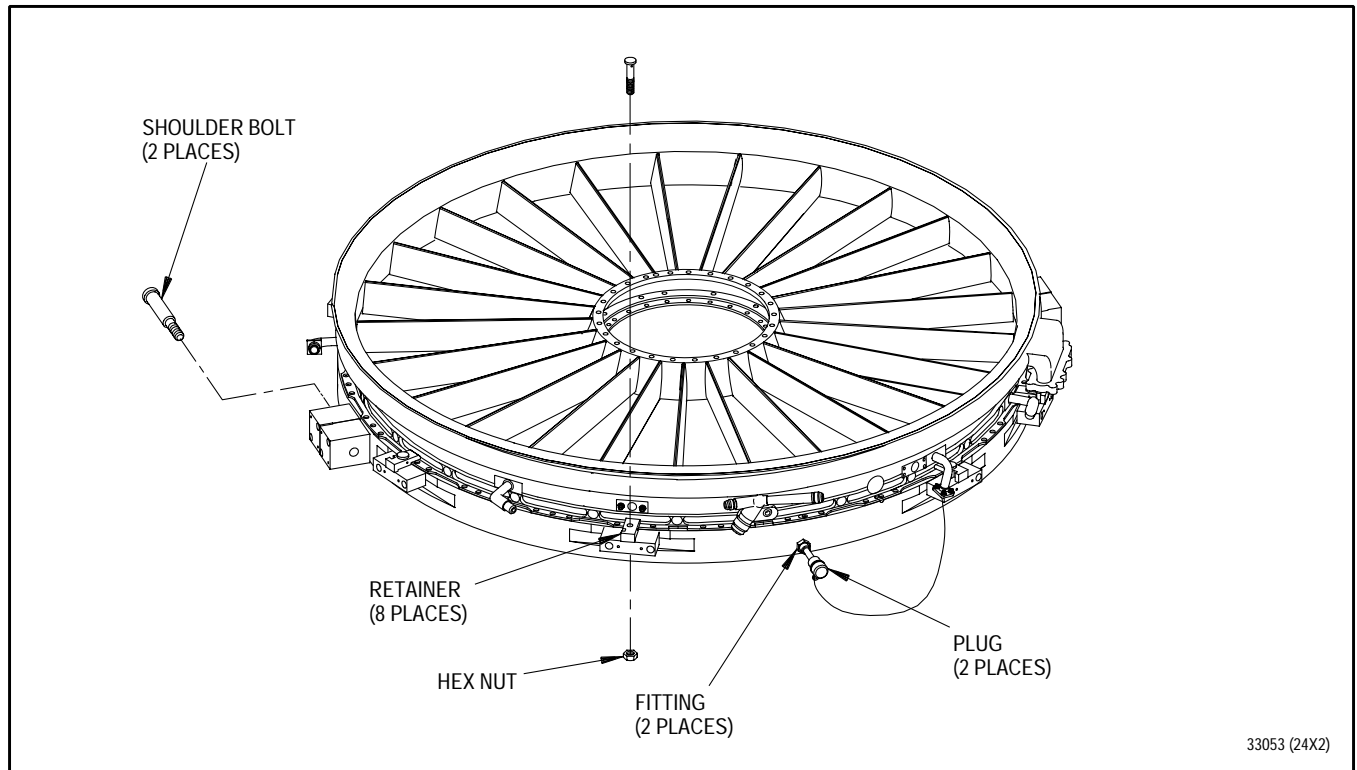


Figure 14. Fan Inlet Case - Installation On PWA 70804 Fixture

NOTE

If dispenser has never been used, clean internal passages using denatured alcohol.

- r. Install PWA 26443 dispenser to injection port fitting on PWA 70804 fixture (6 o'clock position) using tygon tubing and hose clamps.
- s. Remove container from PWA 34571 vacuum chamber.
- t. Mix contents of three tubes curing agent, DC S catalyst, into silicone rubber from step i. Silicone rubber compound shall be injected within 30 minutes after mixing in curing agent.
- u. Stir compound for 5 minutes minimum, using paint stirrer, until smooth consistency is observed. Ensure that all visual streaks have disappeared. Material clinging to sides and bottom of container should be folded into main contents twice during mixing process. No lumps allowed.
- v. Place container in PWA 34571 vacuum chamber for a minimum of 10 minutes at a vacuum of 25 inches Hg or better.
- w. Remove container with rubber compound from vacuum chamber.
- x. Install container with rubber compound in PWA 26443 dispenser. Secure lid using three pins provided with dispenser.
- y. Open PWA 26443 dispenser discharge valve. Ensure that unused valve is closed. Set regulator at 40 to 60 psig.

- z. Monitor and maintain pressure gage at 40 to 60 psig while injecting rubber compound. Actuate control valve to inject uncured silicone rubber compound into PWA 70804 fixture until a steady stream, without air bubbles, is noted at vent port and 1/4 to 1/2 of rubber container has been filled with the overflow. Some leakage may be noted around fixture.
- aa. Install vent port plug, close dispenser discharge valve, and cap off inlet and vent port fittings of PWA 70804 fixture using plugs provided. Retract actuator and disconnect tubing from PWA 70804 fixture.
- ab. Clean PWA 26443 dispenser supply tube and chamber using clean, unsized cheesecloth dampened with denatured alcohol immediately after completion of each use.
- ac. Let PWA 70804 fixture sit on inlet case for minimum of 8 hours at ambient temperature of 50° to 110°F (10° to 43°C) to cure silicone rubber compound.
- ad. Remove plugs.
- ae. Remove PWA 70804 fixture and visually inspect silicone rubber in inlet case for any voids per figure 15. If inspection of silicone rubber exceeds maximum limits, scrape off rubber using locally manufactured non-metallic scraper and repeat steps e. through ag.
- af. Clean PWA 70804 fixture after each use using clean cheesecloth dampened with denatured alcohol.

NOTE

If fan inlet case has been in PWA 70804 fixture for 10 hours or longer, additional two hours cure time is not required.

- ag. After additional 2 hour cure, remove excess flashing using paint stirrer or equivalent. Remove gating material from inlet and vent ports using a razor blade.

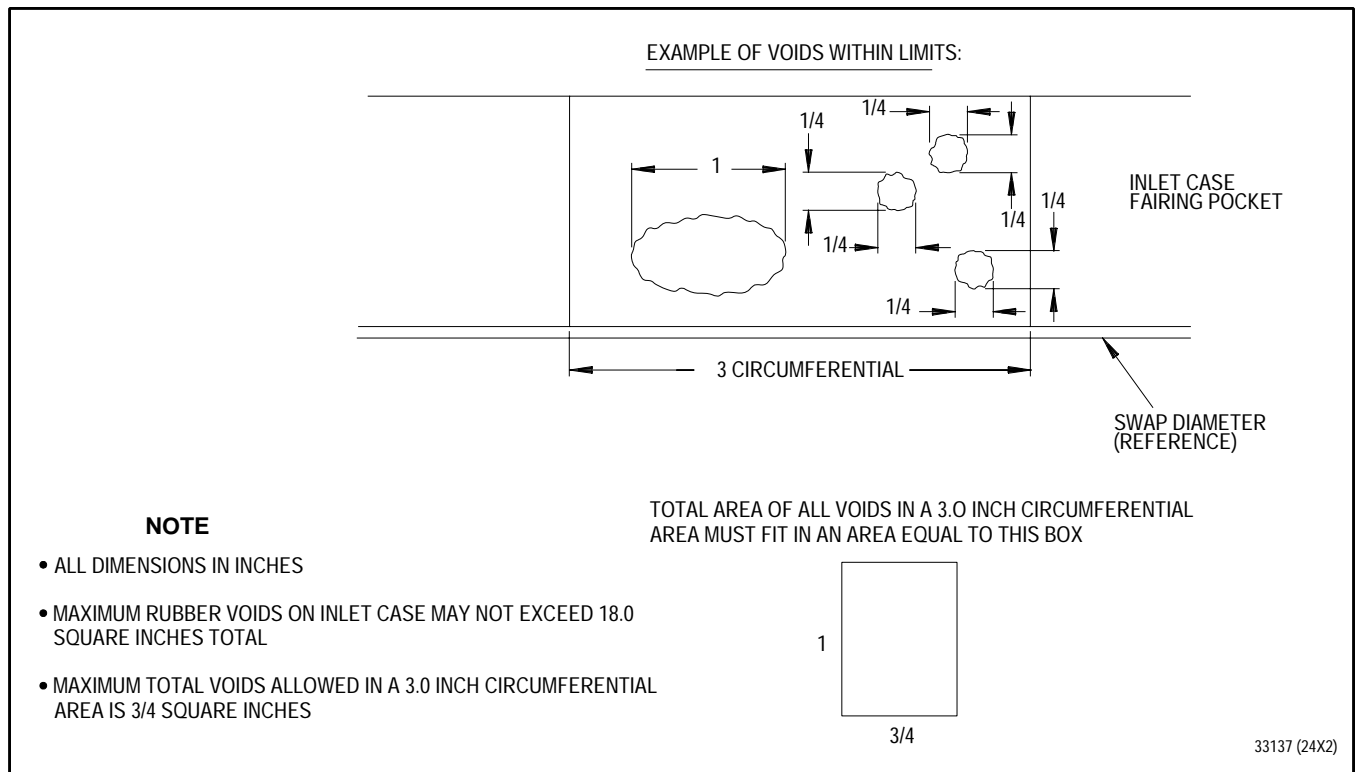


Figure 14. Fan Inlet Case - Fairing Rubber Inspection

13. FAN INLET CASE ASSEMBLY - SEAL GUIDE BLEND REPAIR .

WARNING

Titanium grinding residue is easily ignited and can become explosive under certain conditions. Titanium particles can irritate skin, eyes, and respiratory system. Do not allow titanium to become hot beyond touch point during grinding. No discolorization from grinding allowed.

CAUTION

Use only hand stones, files, dedicated to titanium, silicone carbide crocus cloth. Do not use aluminum oxide abrasives or wire brushes. Aluminum oxide mat cause stress corrosion. Wire brushes may contain rust which can cause stress corrosion and may also produce surface scratches and damage.

Titanium parts shall not be repaired on equipment incorporating a water wash dust collector that is used to repair steel parts. Use care not to allow titanium to become overheated during blending operation. Hard stones or power tools can cause titanium material to overheat and may easily remove too much material. While blending, ensure no contact with strut/airfoil occurs.

- Use crocus cloth, emery cloth, stones, files, or other hand tools to accomplish blending.
- Maintaining length to depth ratio of 30 or greater, remove minimum amount of material.
- Blend raised material smooth in damaged areas. Blend to transition to undamaged area. Blend surface finish to be as smooth as original part material.

- d. Perform fluorescent penetrant inspection. Refer to T.O. 2-1-111, Service Fluorescent Penetrant Inspection Standards - Master Standard (SFPS-M). No cracks allowed.

14. FAN INLET CASE ASSEMBLY - SEAL GUIDE REPLACEMENT.

NOTE

- The Fan Inlet Case Assembly - Seal Guide Replacement is a Source Demonstration Repair. Send reparable parts to an approved source for repair. An approved source list can be obtained by contacting the cognizant USAF F100 Engineering Source Authority at the address listed in the Qualified Repair Source List (QRSL) located in T.O. 2J-F100-53-1, WP 600 00.
- The critical nature of this repair requires each facility intending to accomplish this repair to contact the F100 Engineering Source Authority at the address listed in the QRSL to obtain information on becoming a source.

WORK PACKAGE

TECHNICAL PROCEDURES

SHROUD, FRONT COMPRESSOR STATOR, INLET -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

This Work Package Supersedes WP 411 00 Through and Including Change 0.

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 8

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 7	16	8 Blank	16		

Title	Number
Introduction and General Information: - - - - -	T.O. 2J-F100-53-1
Silicone rubber (PWA 407) - General Storage, Preparation, and Application Instructions - - - - -	WP 100 00
PWA 52879 Checking Fixture - Nondestructive Test for Rubber to Metal Bond - - - - -	WP 101 00
Qualified Repair Source List (QRSL) - - - - -	WP 602 00

None

Nomenclature	Specification/Vendor Part Number
CLOTH, ABRASIVE, CROCUS	P-C-458

None

Paragraph	Function - Tool Nomenclature	Tool Number
3	INLET FRONT COMPRESSOR STATOR SHROUD - AIR SEALING RING SILICONE RUBBER REPLACEMENT	
	HOLDER - - - - -	PWA 70902
	FIXTURE - - - - -	PWA 71154
	FIXTURE - - - - -	PWA 70522
	FIXTURE - - - - -	PWA 70523

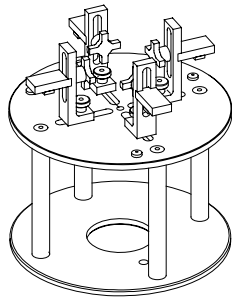
To Be Supplied

To Be Supplied

Figure T1. PWA 70522 FIXTURE

Figure T2. PWA 70523 FIXTURE

ILLUSTRATED SUPPORT EQUIPMENT (continued)



PWA 70902 -C

Figure T3. PWA 70902 HOLDER

To Be Supplied

Figure T4. PWA 71154 FIXTURE

1. INTRODUCTION.

- a. This work package contains instructions for repair of inlet front compressor stator shroud.

2. INLET FRONT COMPRESSOR STATOR SHROUD - BLEND REPAIR.

- a. Blend nicks and scratches, with sharp indentations or chafing and wear, any place on OD up to 0.020 inch deep. Use crocus cloth, stones, and files. Maximum depth of blend shall be 0.015 inch. Length to depth ratio shall be minimum of 15 to 1.
- b. Blend nicks or dents on slot edges to a maximum depth of 0.040 inch using crocus cloth, stones and files.
- c. Remove minimum amount of material. Blend area shall be as smooth or smoother than adjacent surfaces.
- d. Fluorescent penetrant inspect blended area. Refer to T.O. 2J-F100-9. No cracks allowed.

3. INLET FRONT COMPRESSOR STATOR SHROUD - AIR SEALING RING SILICONE RUBBER REPLACEMENT.

(See Figure 1.)

- a. Remove existing air sealing ring rubber by conventional methods. Refer to T.O. 2J-F100-53-1, WP 100 00. Alternately, remove rubber by waterjet stripping as follows:

NOTE

Waterjet stripping of PWA 407 rubber is a source qualified procedure. Refer to T.O. 2J-F100-53-1, WP 602 00 for approved procedure number and for additional qualified sources.

- (1) Remove clamping features from PWA 70902 holder.

- (2) Install PWA 71154 fixture onto PWA 70902 holder, locating three posts in top plate.
 - (3) Install shroud on tool assembly, front end down.
 - (4) Install item-2 clamp bar and secure shroud and tool assembly in place with item-3 stud and item-7 hand knob.
 - (5) Waterjet strip rubber from shroud using approved process. Refer to 2J-F100-53-1, WP 602 00.
 - (6) Remove shroud from waterjet fixture, PWA 70902 holder, and PWA 71154 fixture.
 - (7) Visually inspect shroud to verify complete removal of PWA 407 rubber.
- b. Prepare PWA 70522 mold fixture. Refer to T.O. 2J-F100-53-1, WP 100 00.
 - c. Install shroud into PWA 70522 mold fixture as follows:
 - (1) Check that item-5 screws are adjusted flush to below top surface of item-4 outer mold ring.
 - (2) Install mold ring bottom, conical end down, over OD of item-1 base plate.
 - (3) Install shroud, front end down, onto item-1 base plate.
 - (4) Install item-2 segmented ring assembly, conical side down.
 - (5) Check that item-5 screws are adjusted flush to below bottom flanged surface of item-3 back-up ring.
 - (6) Install back-up ring, flanged end down, to engage ID of segmented ring assembly.

- (7) Install item-9 top plate and item-6 clamp plate on top of back-up ring.
- (8) Lift item-4 outer mold ring into position against bottom face of top plate and secure with hex bolts.
- (9) Secure entire assembly together with item-14 nuts.
- (10) Remove item-8 plugs.
- d. Install rubber in shroud until rubber starts to come out of plug port on opposite side of item-8 plugs. Reinstall item-8 plugs. Refer to T.O. 2J-F100-53-1, WP 100 00.
- e. After curing rubber and shroud cools, remove shroud from fixture:
 - (1) Remove item-12 bolts and item-14 nuts. Separate outer mold ring from clamp plate, using item-5 set screws if necessary. Remove top plate and clamp plate.
 - (2) Remove back-up ring using item-5 set screws, if necessary. Remove item-2 screws from item-2 segmented ring. Using standard slide hammer, slide item-2-3 and -2-4 ring segments inboard and remove.
 - (3) Remove remaining two segments by prying against bolt holes at ends of segment. Remove shroud.
- f. Inspect rubber as follows:
 - (1) Visually inspect for voids and defects.
 - (2) Visually inspect for discoloration. No gray rubber is allowed on inlet shroud rubber.
- (3) Hardness shall be within 52 to 65 Durometer A. Hardness of locally repaired area shall be within 40 to 65 Durometer A.
- g. Check integrity of rubber to metal bond. Refer to T.O. 2J-F100-53-1, WP 101 00.
 - (1) Parts which show no signs of bulging or air leakage are acceptable.
 - (2) Parts which show any signs of bulging or air leakage shall be reprocessed. Refer to T.O. 2J-F100-53-1, WP 100 00.
- h. Install shroud into PWA 70523 machining fixture as follows:
 - (1) Loosen item-5 flange nuts.
 - (2) Move item-3 back-up slides outboard and out of position.
 - (3) Rotate item-13 clamp straps out of position.
 - (4) Install shroud, front end down, engaging OD locating diameter and adjacent surface of item-1 base plate.
 - (5) Secure shroud in place with clamp straps and flange nuts.
 - (6) Move back-up slides inboard until contact is made with OD of shroud and secure in place with flange nuts.
 - (7) Install and secure tooling/shroud assembly on machine.
- i. Finish machine silicone rubber to requirements of figure 1.



- UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS APPLY WHEN SURFACE G IS FLAT WITHIN 0.001 AND DIAMETER F MAINTAINS A CLEARANCE ENVELOPE OF 10.097 DIAMETER IN FREE STATE OR CONSTRAINED. CONSTRAINT CONTACT ALLOWED ONLY ON SURFACE G, H AND DIAMETER F. IN FREE STATE SURFACE G IS FLAT WITHIN 0.010 AND DIAMETER F IS 10.093 TO 10.107 DIAMETER.
- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED.

74858 (36X2)

Figure 1. Inlet Front Compressor Stator Shroud - Rubber Machining Dimensions

Legend for figure 1

1. 2.105 to 2.145 inches
2. 1.705 to 1.745 inches
3. 0.005 to 0.020 inch modified radius
4. 12.500 inch diameter measured at gage point C.
5. 12.620 inches diameter measured at gage point D.
6. Apply primer and silicone rubber per text.
7. 0.000 to 0.010 inch mismatch permissible
8. 2.510 to 2.530 inches
9. Profile tolerance of these surfaces shall be within 0.005 inch in relation to Surface A and Diameter B.
10. 1.925 inches
11. 2.325 inches
12. 1 degree maximum, 2 places

WORK PACKAGE

TECHNICAL PROCEDURES

VANE, FRONT COMPRESSOR STATOR VARIABLE -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 6					0

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Nondestructive Inspection - - - - -	T.O. 2J-F100-9

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Cloth, abrasive, crocus	P-C-458
Compound, Silicone rubber	RTV 102/103 or 732
Methyl ethyl ketone (MEK) (PMC 9076)	TT-M-261

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for repair of the front compressor stator variable inlet vanes.

2. FRONT COMPRESSOR STATOR VARIABLE INLET VANE - BLEND REPAIR.

(See Figure 1.)

NOTE

This procedure is for nicks, dents or cracks in vane trailing edge.

- a. Vanes with blends 0.030 inch deep or less can be accepted with any quantity of blends.
- b. Vanes which are blended in excess of 0.030 inch are limited to no more than three places per vane and six vanes maximum in any assembly.

- c. Blends that are greater than 0.030 inch deep shall be accomplished as follows:

- (1) Determine size of damaged area by fluorescent penetrant inspection. Refer to T.O. 2J-F100-9.



No grinding permitted on airfoil or cavity.

- (2) Scallop blend using fine files, stones or crocus cloth.
- (3) Remove minimum material required.
- (4) All blend radii shall be smooth and gently rounded with no sharp corners. Break edges in blend areas 0.005 to 0.015 inch radius.
- (5) Machine finish by material removal.
- (6) Surface texture shall be per PWA 362 in T.O. 2-1-111.
- (7) Fluorescent penetrant inspect repair. Refer to T.O. 2J-F100-9. No cracks permitted.

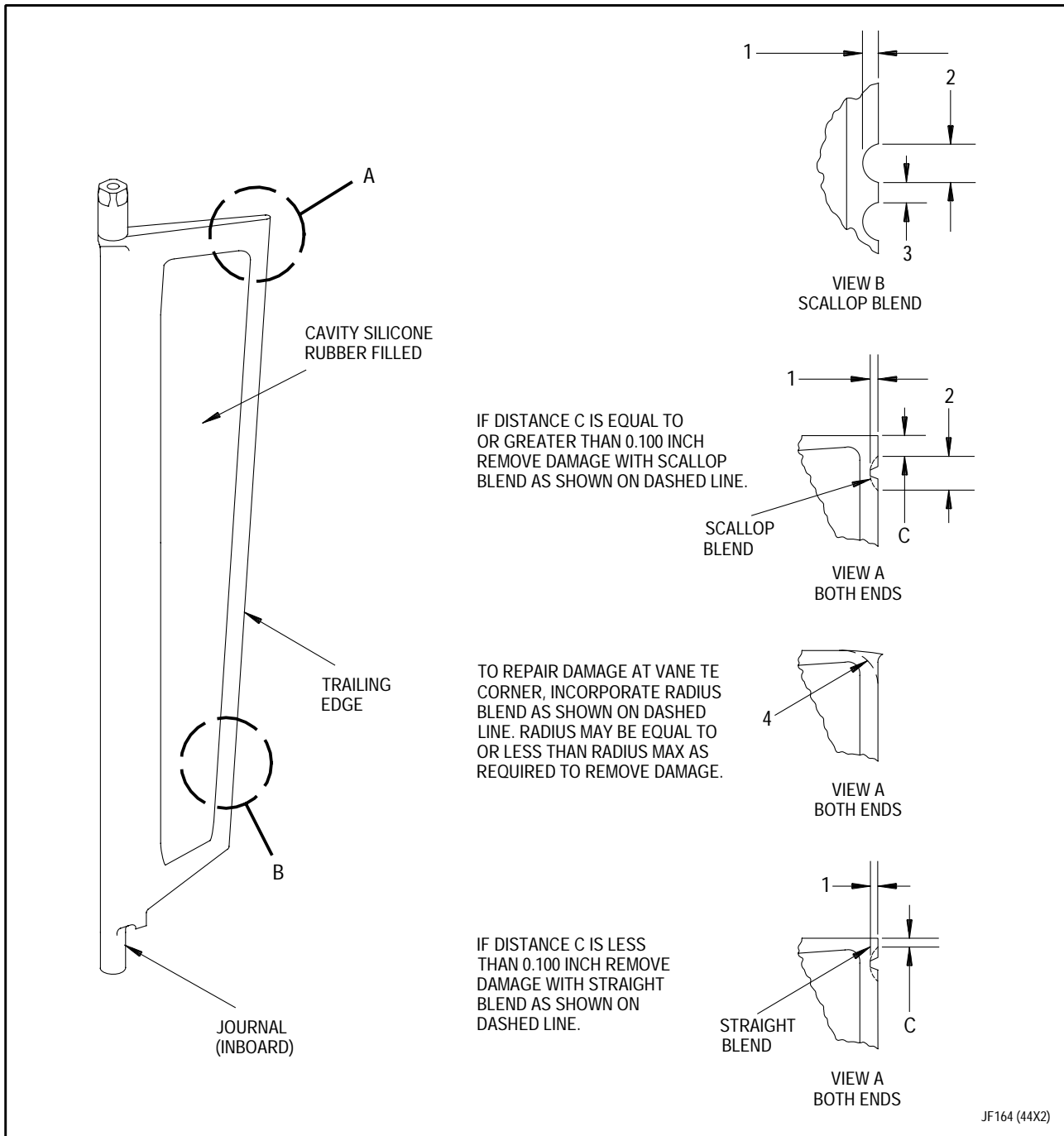


Figure 1. Front Compressor Stator Variable Inlet Vane - Blend Repair

Legend for figure 1

1. 0.0125 inch maximum
2. 0.500 to 0.625 inch maximum
3. 0.100 inch minimum between blends
4. 0.625 inch maximum radius, radius blend

**3. FRONT COMPRESSOR STATOR VARIABLE
INLET VANE - AIRFOIL METAL SURFACE
BLEND REPAIR.**

(See figure 1.)



No grinding permitted on
airfoil or cavity.

NOTE

This procedure is for nicks and
scratches on airfoil metal
surfaces on concave sides vane
leading edge and vane ends.

- a. Blend using fine files, stones
or crocus cloth.

- b. Remove minimum amount of
material. Maximum blend depth
shall be 0.030 inch maximum
depth.
- c. All blend radii shall be smooth
and gently rounded with no sharp
corners. Bread edges in blend
areas 0.005 to 0.015 inch
radius.
- d. Machine finish by material
removal.
- e. Surface texture shall be per
PWA 362 in T.O. 2-1-111.
- f. Fluorescent penetrant inspect
repair. Refer to
T.O. 2J-F100-9. No cracks
permitted.

**4. FRONT COMPRESSOR STATOR VARIABLE
INLET VANE - RUBBER INLAY REPAIR.**

(See figure 1.)

- a. Remove loose material around damaged area until only securely bonded rubber remains.
- b. Clean repair areas per PWA 83-2 using methyl ethyl ketone, but air dry for 30 minutes. Refer to T.O. 2-1-111.



Use only RTV 102/103 or 732 adhesive/sealant for rubstrip repair. RTV 103 (black) is preferred.

- c. Fill repair area with RTV 102/103 or 732 adhesive/sealant and spread level with the surrounding area as follows:
 - (1) Locally manufacture spreading tool from 2 inch x 1/8 inch x 6 inch Teflon stock.

NOTE

It may be difficult to fill large, deep voids. In this case two step application of RTV 102/103 or 732 adhesive/sealant may be necessary.

- (2) Partially fill void with RTV 102/103 or 732 adhesive/sealant. Allow sealant to set for 10 to 15 minutes or until tack free.
 - (3) Fill remainder of void with sealant and spread flush with surrounding area.
 - (4) Make sure void is completely filled and there are no air pockets. Minor surface imperfections in cured sealant are acceptable.
- d. Clean sealant overflow from surrounding area.

WORK PACKAGE**TECHNICAL PROCEDURES****BLADES, COMPRESSOR ROTOR
(FIRST, SECOND AND THIRD STAGES) -****REPAIR****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 34

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	27	5 - 8	12	17	17
2 - 2A	26	9	0	18	19
2B - 2C Added	17	10	27	19 - 20 Added	17
2D Blank Added	17	11	26	21	26
3	17	12 - 16	0	22 - 29 Added	26
4	0			30 Blank Added	26

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
Compound, Antigalling (PWA 36545) Application (SPOP 748) - - - - -	SWP 098 07

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
ABRASIVE PAPER, NONMETALLIC	NO. 240
ADHESIVE (PWA 36003)	RTV-159 OR RTV-106 OR DC 3145
ALCOHOL, ISOPROPYL (PMC 9094)	TT-I-735
CHEESECLOTH, UNSIZED (PWA GA100-11)	CCC-C-440
CLOTH, ABRASIVE, 320 GRIT	320 GRIT SILICON CARBIDE
CLOTH, ABRASIVE, 400 GRIT	400 GRIT SILICON CARBIDE
CLOTH, ABRASIVE, 600 GRIT	600 GRIT SILICON CARBIDE
CLOTH, ABRASIVE, CROCUS	P-C-458
COMPOUND, ANTIGALLING (PWA 36545)	ESNALUBE 382
DYE, LAYOUT (PMC 4062)	MICRO-SUPREME (PURPLE) MICHROME AND CHEMICAL CO.
MARKER, MARKS-A-LOT	CARTER'S INK CO.
PENCIL (CRAYON), SILVER, METAL MARKING (HARD)	COLOR-TEX 1843
PRIMER, ADHESIVE (PN 671798)	GE SS-4004 OR DC 1200
STONE, RUBBERIZED ABRASIVE	CRATEX GRIT NO. 86XF OR AW2579-2CH OR EQUIVALENT
TAPE, MASKING	PMC 4134
WHEEL, SILICON CARBIDE	37C80-18V

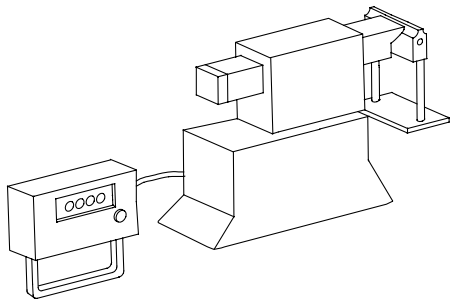
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

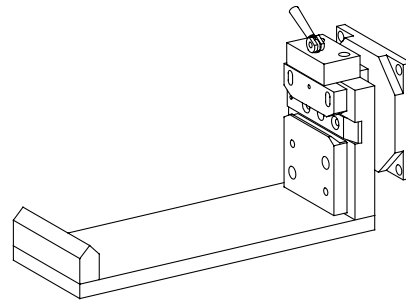
Paragraph	Function - Tool Nomenclature	Tool Number
6	FRONT COMPRESSOR ROTOR BLADES - MOMENT-WEIGHT	
	TESTER, MOMENT-WEIGHT - - - - -	PWA 55456
	ADAPTER, 1ST STAGE BLADE - - - - -	PWA 57676
	ADAPTER, 2ND STAGE BLADE - - - - -	PWA 57677
	ADAPTER, 3RD STAGE BLADE - - - - -	PWA 57678
7	COMPRESSOR ROTOR BLADES (STAGES ONE THROUGH THREE) BLADE ROOT - PLASMA SPRAY COATING (PWA 53-69) STRIP AND RECOAT	
	PEDESTAL-AUTOMATED SHOTPEEN INSTALLATION - - - - -	PWA 70449
	FIXTURE-SHOTPEEN, 1ST THRU 7TH STAGE BLADES - - - - -	PWA 71091
	ADAPTER-PLATE, 1ST STAGE FAN BLADES - - - - -	PWA 71092
	ADAPTER-PLATE, 2ND THRU 5TH STAGE BLADES - - - - -	PWA 71093
	MASK ASSY, SHOTPEEN, BLADE ROOT COMPRESSOR ROTOR 1ST STAGE - - - - -	PWA 70841
	MASK ASSY-SHOTPEEN, BLADE ROOT COMPRESSOR ROTOR 2ND STAGE - - - - -	PWA 70842
	MASK ASSY-SHOTPEEN, BLADE ROOT COMPRESSOR ROTOR 3RD STAGE - - - - -	PWA 70843
	HOLDER-TEST PIECE, 1ST STAGE FAN BLADE - - - - -	PWA 70844
	HOLDER-TEST PIECE, 2ND STAGE FAN BLADE - - - - -	PWA 70845
	HOLDER-TEST PIECE, 3RD STAGE FAN BLADE - - - - -	PWA 70846
	MASK FIXTURE, PLASMA SPRAY, 1ST STAGE FAN BLASE ROOT	PWA 70835
	MASK FIXTURE, PLASMA SPRAY, 2ND STAGE FAN BLADE ROOT - - - - -	PWA 70837
	MASK FIXTURE, PLASMA SPRAY, 3RD STAGE FAN BLADE ROOT - - - - -	PWA 70839
	THICKNESS GAGE, PLASMA SPRAY, 1ST, 2ND 3RD STAGE FAN BLADE ROOT - - - - -	PWA 70836
8	COMPRESSOR ROTOR BLADES (STAGES ONE THROUGH THREE) - PLATFORM BLEND REPAIR	
	FIXTURE, SHOTPEEN, 1ST THRU 7TH STAGE BLADES - - - - -	PWA 71091
	PEDESTAL, AUTOMATED SHOTPEEN INSTALLATION - - - - -	PWA 70449

ILLUSTRATED SUPPORT EQUIPMENT



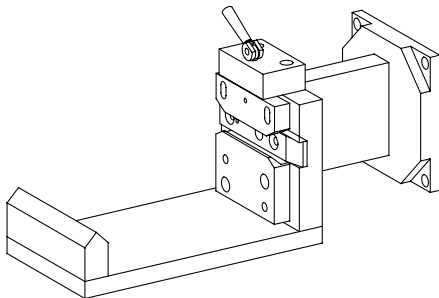
PWA 55456 -C

Figure T1. PWA 55456 TESTER



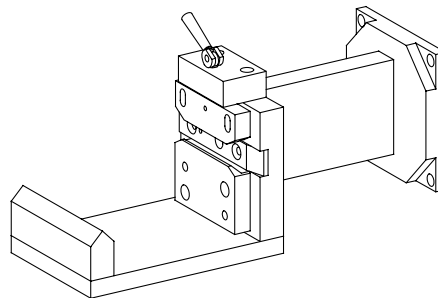
PWA 57676 -C

Figure T2. PWA 57676 ADAPTER



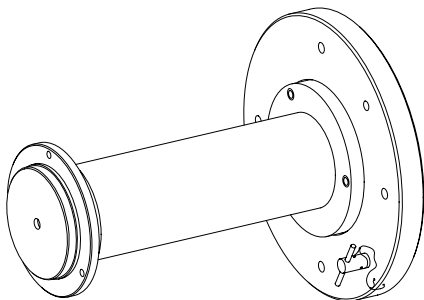
PWA 57677 -C

Figure T3. PWA 57677 ADAPTER



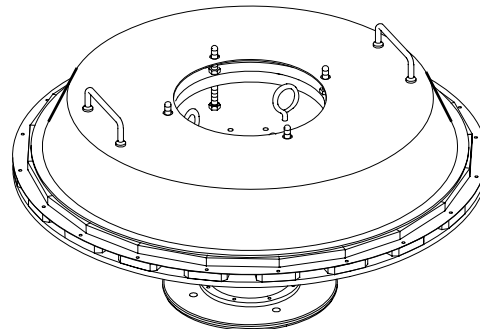
PWA 57678 -C

Figure T4. PWA 57678 ADAPTER



PWA 70449 -C

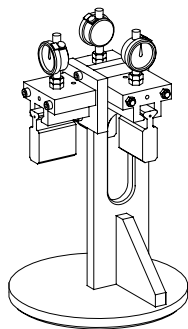
Figure T5. PWA 70449 PEDESTAL



PWA 70835 -C

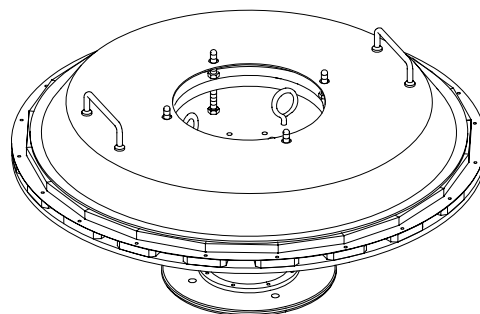
Figure T6. PWA 70835 MASK FIXTURE

ILLUSTRATED SUPPORT EQUIPMENT (continued)



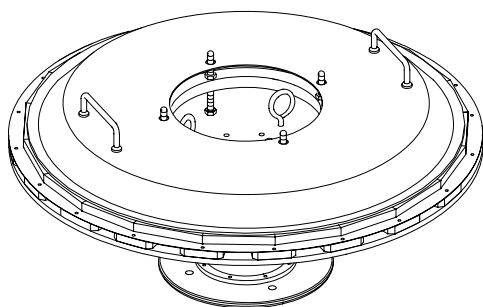
PWA 70836 -C

Figure T7. PWA 70836 THICKNESS GAGE



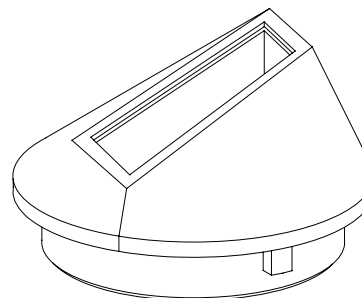
PWA 70837 -C

Figure T8. PWA 70837 MASK FIXTURE



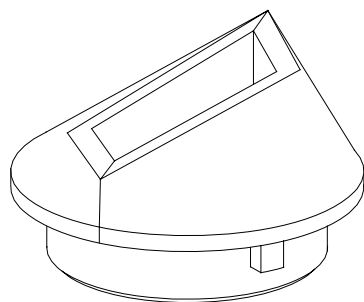
PWA 70839 -C

Figure T9. PWA 70839 MASK FIXTURE



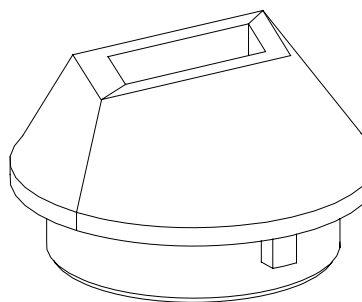
PWA 70841 -C

Figure T10. PWA 70841 MASK ASSY



PWA 70842 -C

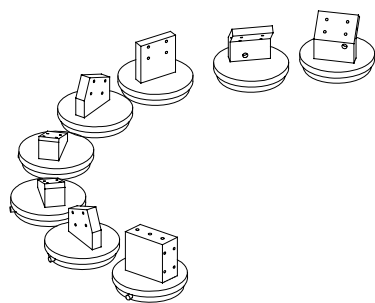
Figure T11. PWA 70842 MASK ASSY



PWA 70843 -C

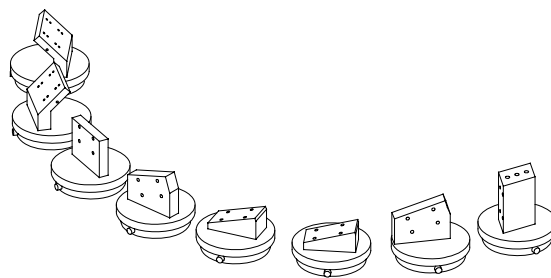
Figure T12. PWA 70843 MASK ASSY

ILLUSTRATED SUPPORT EQUIPMENT (continued)



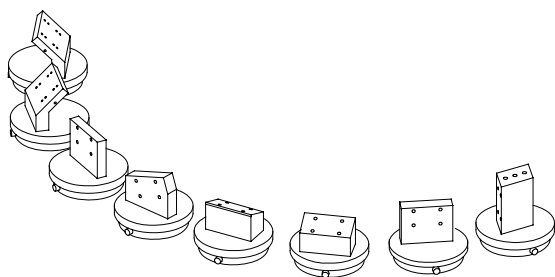
PWA 70844 -C

Figure T13. PWA 70844 HOLDER



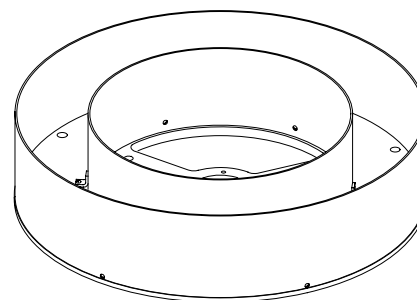
PWA 70845 -C

Figure T14. PWA 70845 HOLDER



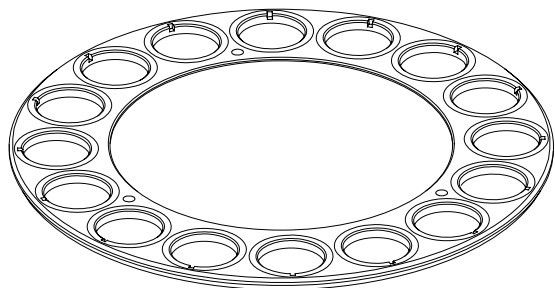
PWA 70846 -C

Figure T15. PWA 70846 HOLDER



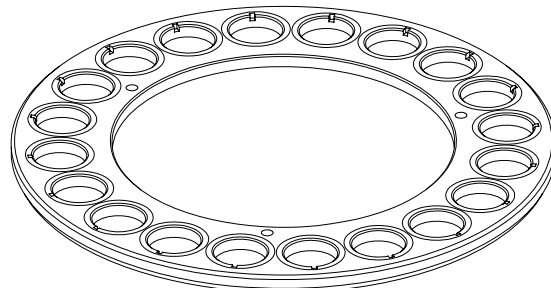
PWA 71091 -C

Figure T16. PWA 71091 FIXTURE



PWA 71092 -C

Figure T17. PWA 71092 ADAPTER



PWA 71093 -C

Figure T18. PWA 71093 ADAPTER

1. INTRODUCTION.

- a. This work package contains instructions for repair of first, second, and third stage compressor rotor blades.

2. COMPRESSOR ROTOR BLADES (STAGES ONE THROUGH THREE) - BLEND REPAIR.

(See Figure 1.)



Any damage in inner half of airfoil shall be treated with extreme caution.

NOTE

- Do not attempt to remove damage by straightening.
- Grinding and/or stoning and polishing of compressor blades shall be done lengthwise to blade and never across it. This is to ensure that no scratches, however minute, run across blade edge. Elimination of damaged areas in blade shall be performed by local hand blending of damaged area only. Surface finish shall be comparable to new blade. Buffing of entire area of blade is not permitted.
- All surfaces shall be smooth and repairs well-blended.

- Do not reduce airfoil cross-sectional width while blending, round off edges of blended surface, but do not extend beyond maximum limits.
 - Limits of referenced figure apply to damaged area after blending and not to size of damage measured before blending.
- a. Blend all airfoil damage per following limits and limits of figure 1.
 - (1) Minimum allowable distance between any two scallop blends on same blade edge is 0.100 inch.

NOTE

Steps (2), (3) and (4) are not independent and shall be met on each blade or stage simultaneously. For example, if a blade has scallop and tip blends, limits in both steps (2), (3), and (4) shall be met.

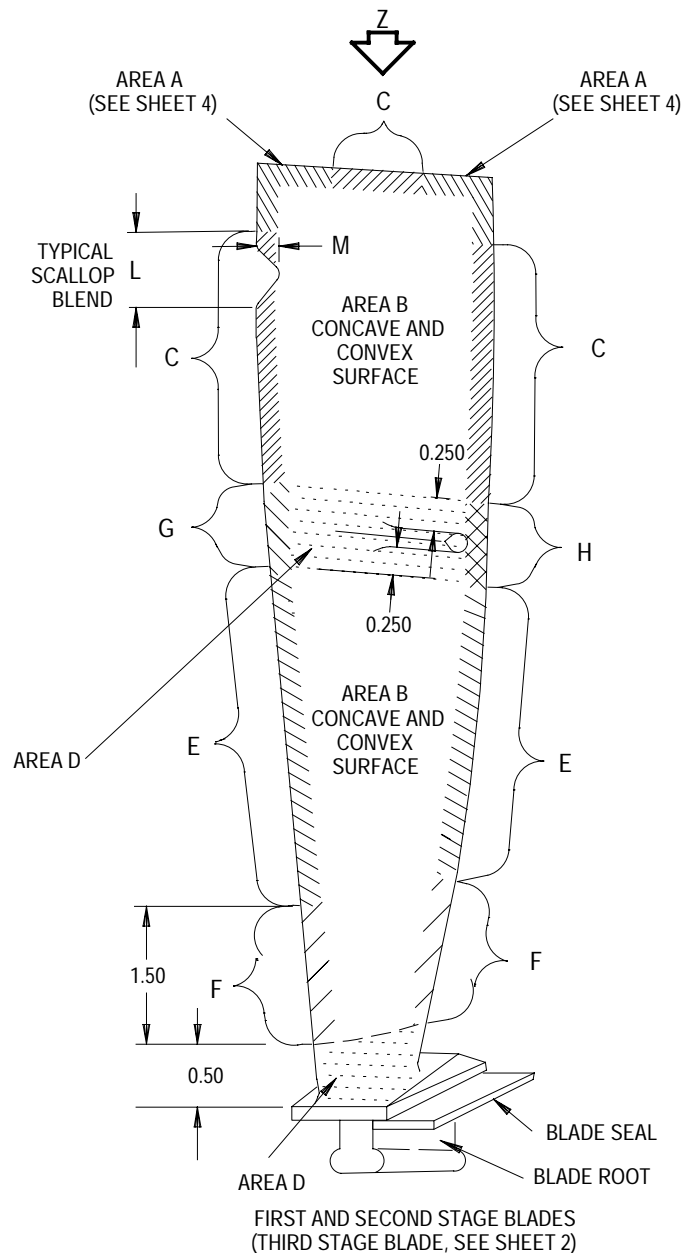
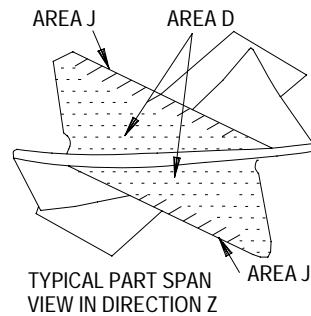
- (2) Only scallop blends greater than 0.030 inch deep shall be taken into account when calculating cumulative blend limits; i.e. scallop blend areas with 0.030 inch or less deep are acceptable in any amount provided conditions of step a. (1) are met.

MAXIMUM REPARABLE NICK LIMITS
(AFTER BLENDING)

BLADE AREA		STAGE 1	STAGE 2
	B	0.032 RB	0.032 RB
	C	0.312 M	0.312 M
	D	0.003 RB	0.003 RB
	E	0.250M	0.250M
	F	0.250 M	0.062 M
	G	0.200 M	0.200 M
	H	0.200 M	NONE
	J	0.062 M	0.062 M

RB=DEPTH OF ROUND BOTTOM BLEND IN AIRFOIL SURFACE

M=DEPTH OF SCALLOP BLEND AS MEASURED FROM
ORIGINAL MANUFACTURED EDGE OF BLADE.

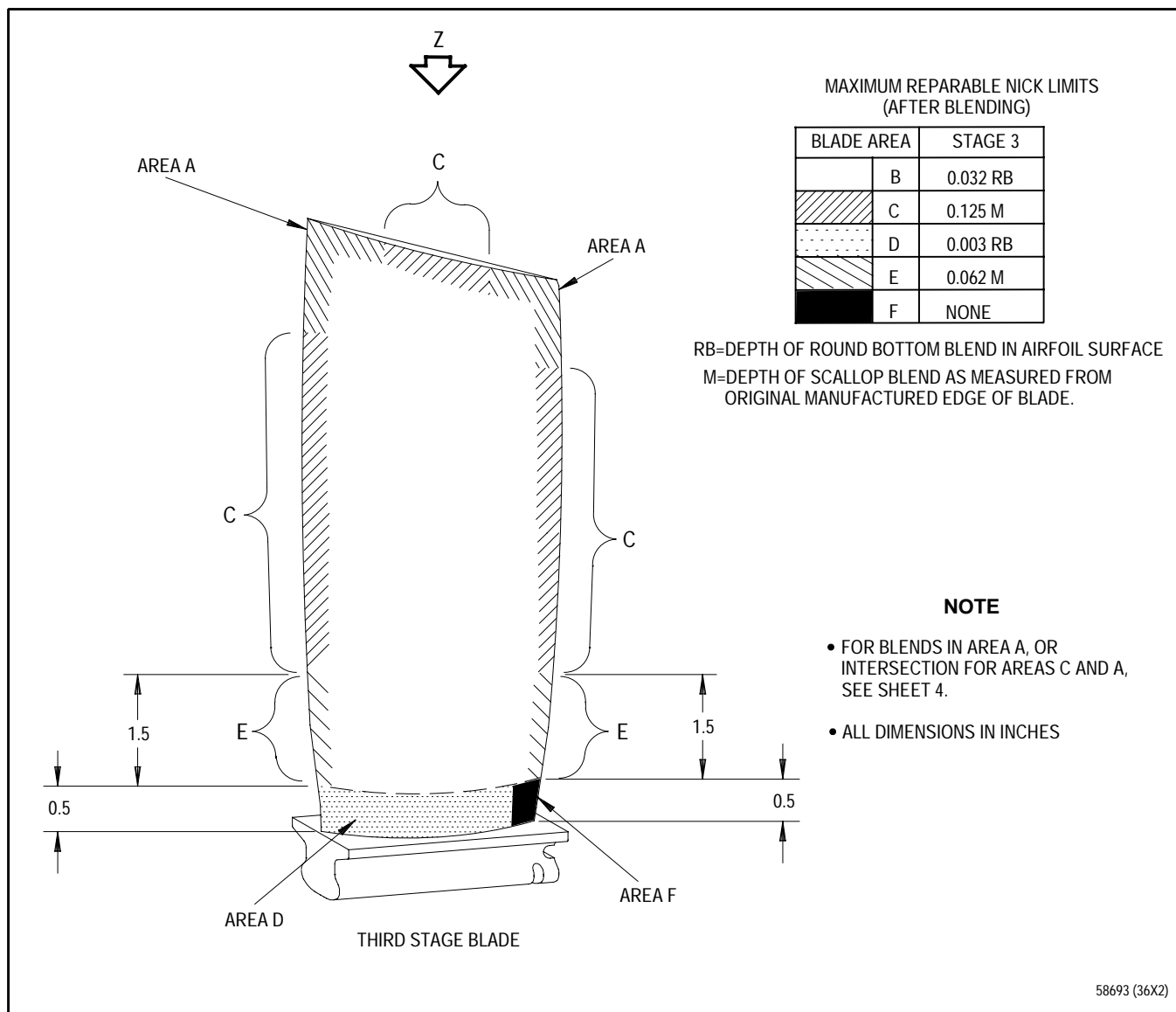


NOTE

- ALL DIMENSIONS IN INCHES
- L= LENGTH OF SCALLOP BLEND; L MAXIMUM= 5 TIMES MAXIMUM ALLOWABLE BLEND DEPTH FOR APPLICABLE BLADE AREA; L MINIMUM= 4 TIMES BLEND DEPTH M. REMOVE MINIMUM MATERIAL AS REQUIRED WITHIN THESE LIMITS.
- ALL BLEND RADII MUST BE SMOOTH AND GENTLY ROUNDED WITH NO SHARP CORNERS. BREAK SHARP EDGES IN BLEND AREA 0.005 TO 0.015 RADIUS.
- FOR BLENDS IN AREA A OR AT INTERSECTION FOR AREAS C AND A, SEE SHEET 4.

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**Figure 1. First, Second, and Third Stage Compressor Rotor Blades - Reparable Limits After Blending
(Sheet 1 of 4)**



**Figure 1. First, Second, and Third Stage Compressor Rotor Blades - Reparable Limits After Blending
(Sheet 2 of 4)**

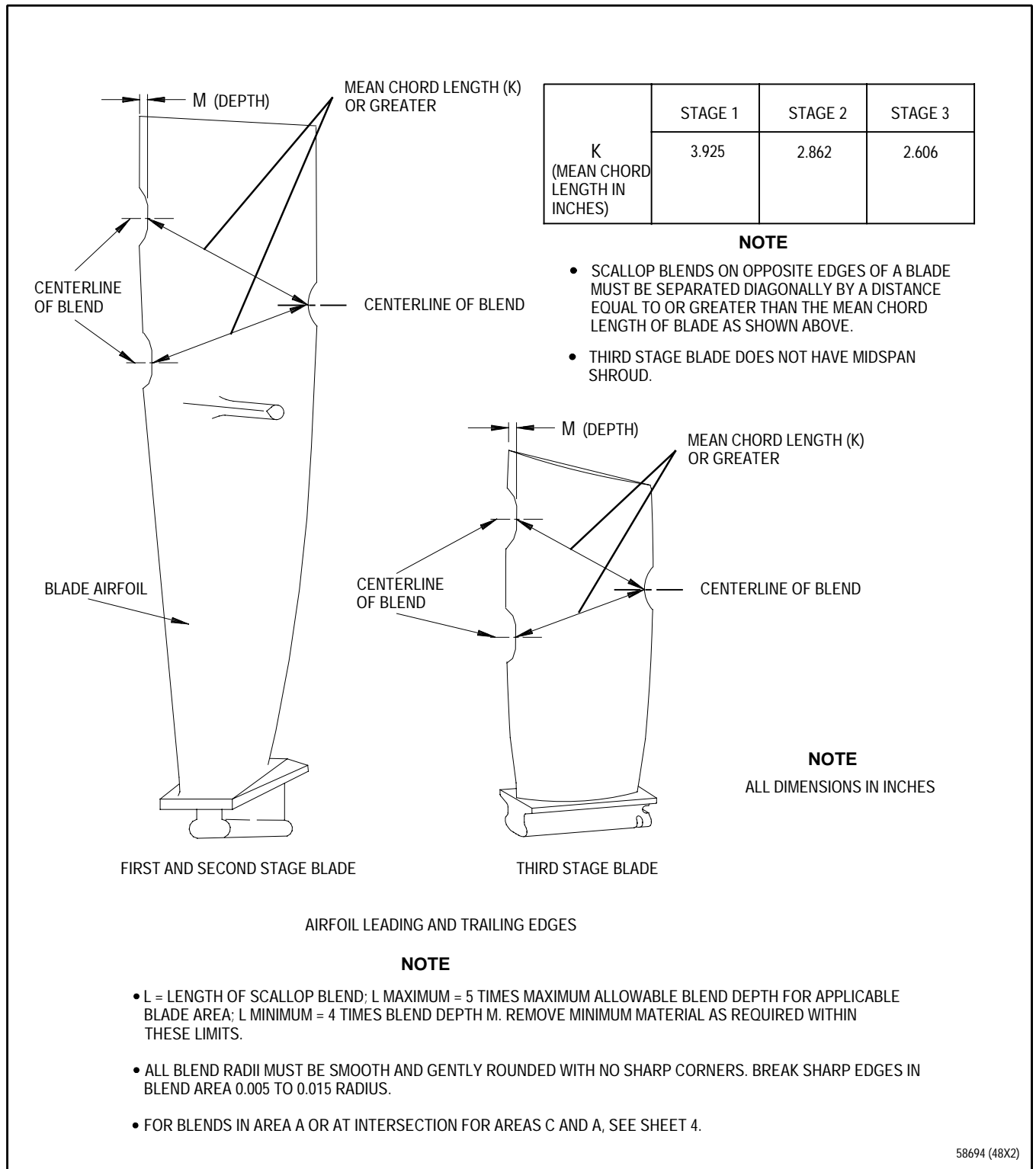
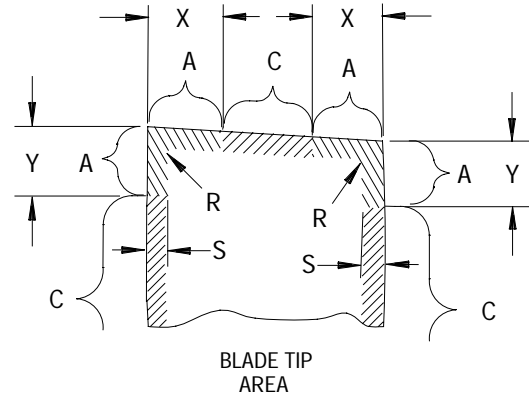


Figure 1. First, Second, and Third Stage Compressor Rotor Blades - Repairable Limits After Blending (Sheet 3 of 4)

MAXIMUM REPARABLE NICK LIMITS (AFTER BLENDING) IN AREA A (BLADE TIP)			
DIM	1ST STAGE	2ND STAGE	3RD STAGE
X	1	0.750	0.750
Y	1	0.750	0.750
R (MAX)	1	0.750	0.750
S (MAX)	0.312	0.312	0.250

WHERE:

- X, Y = DIMENSIONAL BOUNDARY OF AREA A
 R = RADIUS BLEND IN AREA A
 S = DEPTH OF SCALLOP OR STRAIGHT BLEND IN AREA A AS MEASURED FROM ORIGINAL MANUFACTURED EDGE OF BLADE

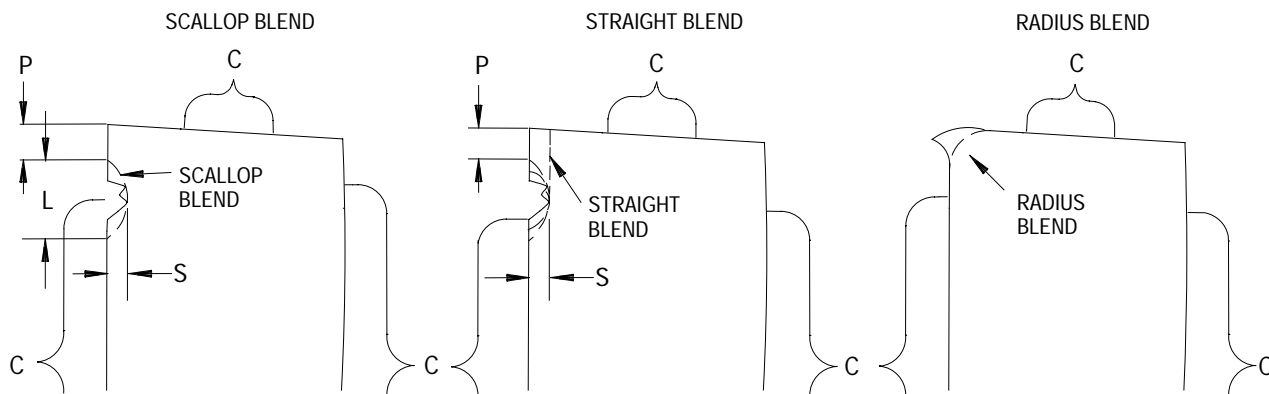


NOTE

ALL DIMENSIONS IN INCHES

BLADE AREA	
A	C

BLADE TIP BLEND ILLUSTRATIONS



IF DISTANCE P IS EQUAL TO OR GREATER THAN BLEND DEPTH S, REMOVE DAMAGE WITH SCALLOP BLEND AS SHOWN ON DASHED LINE. WHERE L = LENGTH OF SCALLOP BLEND, L MAX = 5 TIMES S, AND L MIN = 4 TIMES S. BLEND MAY EXTEND INTO AREA C.

IF DISTANCE P IS LESS THAN BLEND DEPTH S, REMOVE DAMAGE WITH STRAIGHT BLEND AS SHOWN ON DASHED LINE. MAXIMUM PORTION OF STRAIGHT BLEND LENGTH ALLOWED IN AREA C IS 0.5 FOR ALL STAGES.

TO REPAIR DAMAGE AT BLADE TIP CORNER, INCORPORATE RADIUS BLEND AS SHOWN ON DASHED LINE WITHIN AREA A, WHERE R MAY BE EQUAL TO OR LESS THAN R MAX AS REQUIRED TO REMOVE DAMAGE.

NOTE

- P = DISTANCE FROM END OF PROPOSED SCALLOP BLEND TO BLADE TIP CORNER
- ALL BLEND RADII MUST BE SMOOTH AND GENTLY ROUNDED WITH NO SHARP CORNERS. BREAK SHARP EDGES IN BLEND AREA 0.005 TO 0.015 RADIUS.
- STRAIGHT BLENDS, AT BLADE TIP, CAN BE FURTHER REPAIRED BY USE OF A SCALLOP OR RADIUS BLEND, IN THE SAME AREA, WHEN MINOR DAMAGE HAS BEEN INCURRED. MAINTAIN MAXIMUM LENGTH AND DEPTH LIMITS.

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Figure 1. First, Second, and Third Stage Compressor Rotor Blades - Reparable Limits After Blending (Sheet 4 of 4)

(3) The maximum reparable compressor blade airfoil damage is limited by figure 1 and following:

(a) Maximum allowable cumulative blend limits for all blendable areas (figure 1) on leading and trailing edges are (L) inches per blade and (T) inches total length per stage where:

	L (Inches)	T (Inches)
Stage 1	3 13/16	29
Stage 2	3 9/16	42 3/4
Stage 3	3 3/32	24 3/4

(4) Maximum allowable total tip blends are:

- Stage 1 can have any amount of tip blends (within limits of step a. (3)) except no more than six blades may have maximum tip blend radius.
- Stages 2 and 3 are limited to 5.0 inches of tip blends per stage. For example, five blades allowed with 1.0 inch tip blend, or ten blades allowed with 0.5 inch tip blends, etc.

(5) Inspect blades for cracks using fluorescent penetrant method. Refer to T.O. 2J-F100-9. No cracks allowed.

3. COMPRESSOR ROTOR BLADES (STAGES ONE AND TWO) - MIDSPAN HARDFACING.

(See Figure 2.)

NOTE

- Hardface blades before replacing blade root rubber, seal strips, and antigalling compound.
- Parent material is PWA 1202 titanium for:
PN 4066301 and 4066302 (Detail)
(PN 4066171 and 4066172 - Assembly)
- Parent material is PWA 1228 titanium for:
PN 4076701 and 4076702 (Detail)
(PN 4076781 and 4076782 - Assembly)

a. Send all 1st and 2nd stage compressor blades to address listed in T.O. 2-1-111 for stripping and replacing PWA 46 or PWA 256-4 hardfacing. Fluorescent penetrant inspect per T.O. 2J-F100-9, SPOP 82 (except use ZL-30 penetrant) after stripping and before hardfacing. No cracks allowed. Areas of PWA 53-69 coating on both sides of blade root must be protected during stripping. See figure 2.

b. Midspan hardface requirement of drawings must be maintained.

- PN 4066301 and 4066302 (Detail) (PN 4066171 and 4066172 - Assembly)
- PN 4076701 and 4076702 (Detail) (PN 4076781 and 4076782 - Assembly)

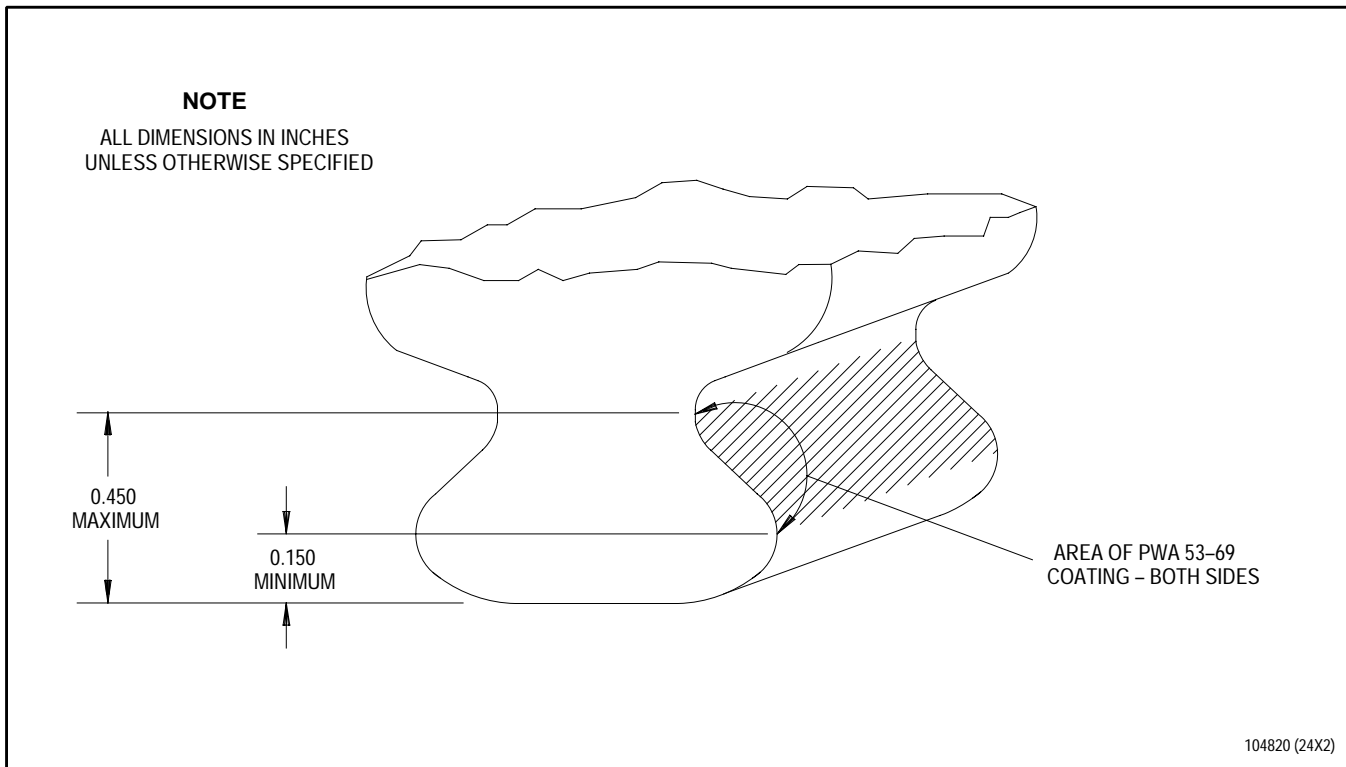


Figure 2. Compressor Rotor Blades (Stages One and Two) - PWA 53-69 Coating Area

4. COMPRESSOR ROTOR BLADES (STAGES ONE THROUGH THREE) BLADE ROOT - ANTIGALLING COMPOUND REMOVAL AND APPLICATION.

(See Figure 3.)

NOTE

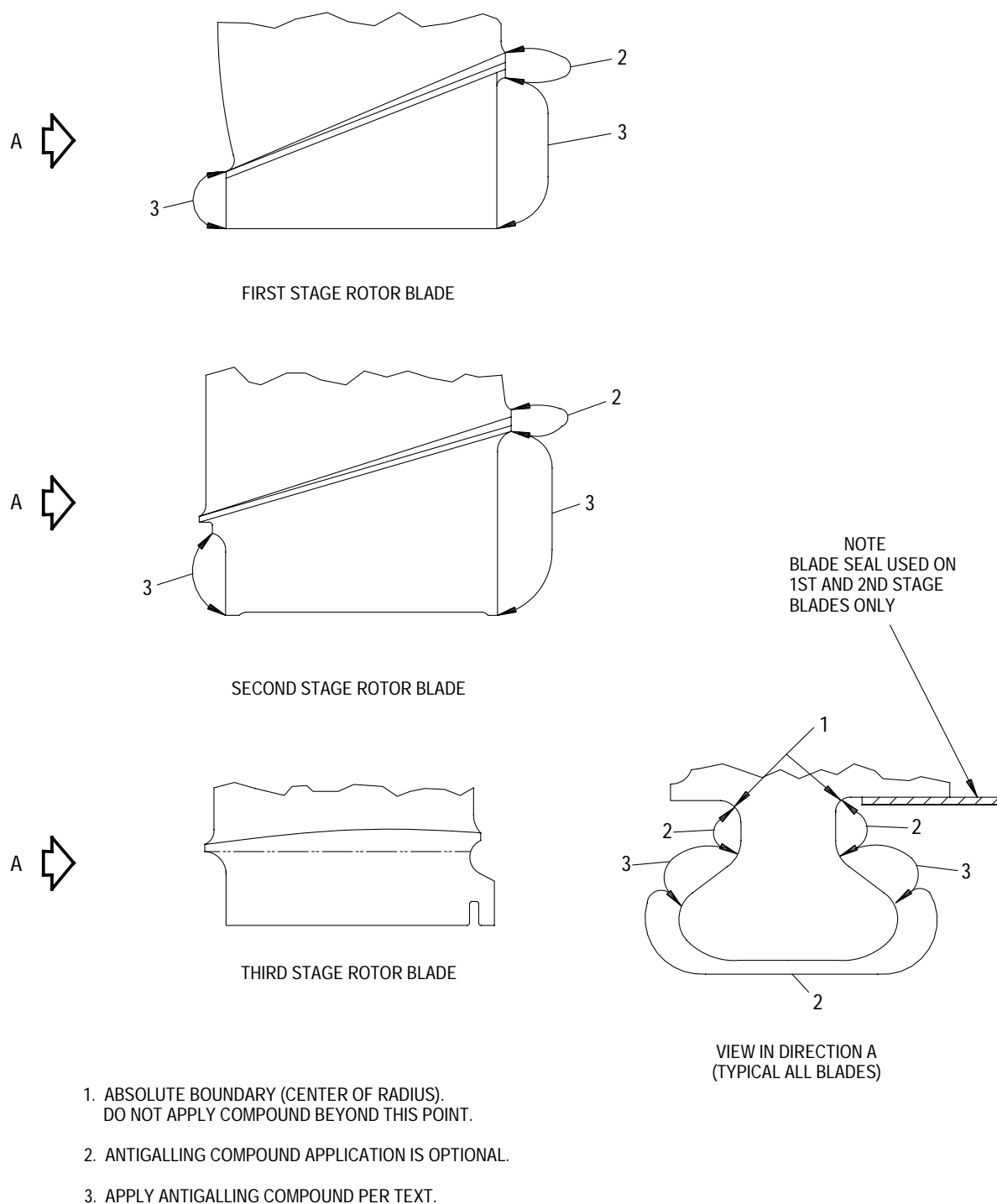
If part midspan shroud hardfacing requires replacement, replace hardface before antigalling compound application.

- a. Prior to re-coating, ensure all repairs have been accomplished before this operation.

NOTE

No surface preparation is required before application of compound.

- a1. Strip coating. Refer to T.O. 2-1-111, SPOP 748.
- b. Ensure that surface is dry. Apply PWA 36545 antigalling compound to blade root area shown. Refer to T.O. 2-1-111, SPOP 748.



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Figure 3. Compressor Rotor Blades (Stages One Through Three) Blade Root - Antigalling Compound Application

5. FRONT COMPRESSOR ROTOR BLADES - SEAL REPLACEMENT.

(See Figure 4.)

- a. Remove unserviceable rubber seal and adherent residue from blade platform.
 - (1) Remove rubber seal by hand. Use wooden or plastic scraper if necessary.
 - (2) Use a wire brush with bristles of fine stainless steel wire to remove remaining rubber. Brush material lightly by hand so as not to remove and scratch the base metal. No power brushing permitted.
- b. Lightly polish bonding surface of blade platform using hand held, No. 240 nonmetallic abrasive paper.
- c. Wipe bonding surface of blade platform with unsized cheesecloth dampened with isopropyl alcohol. (See figure 4.) Air dry for 10 to 15 minutes.

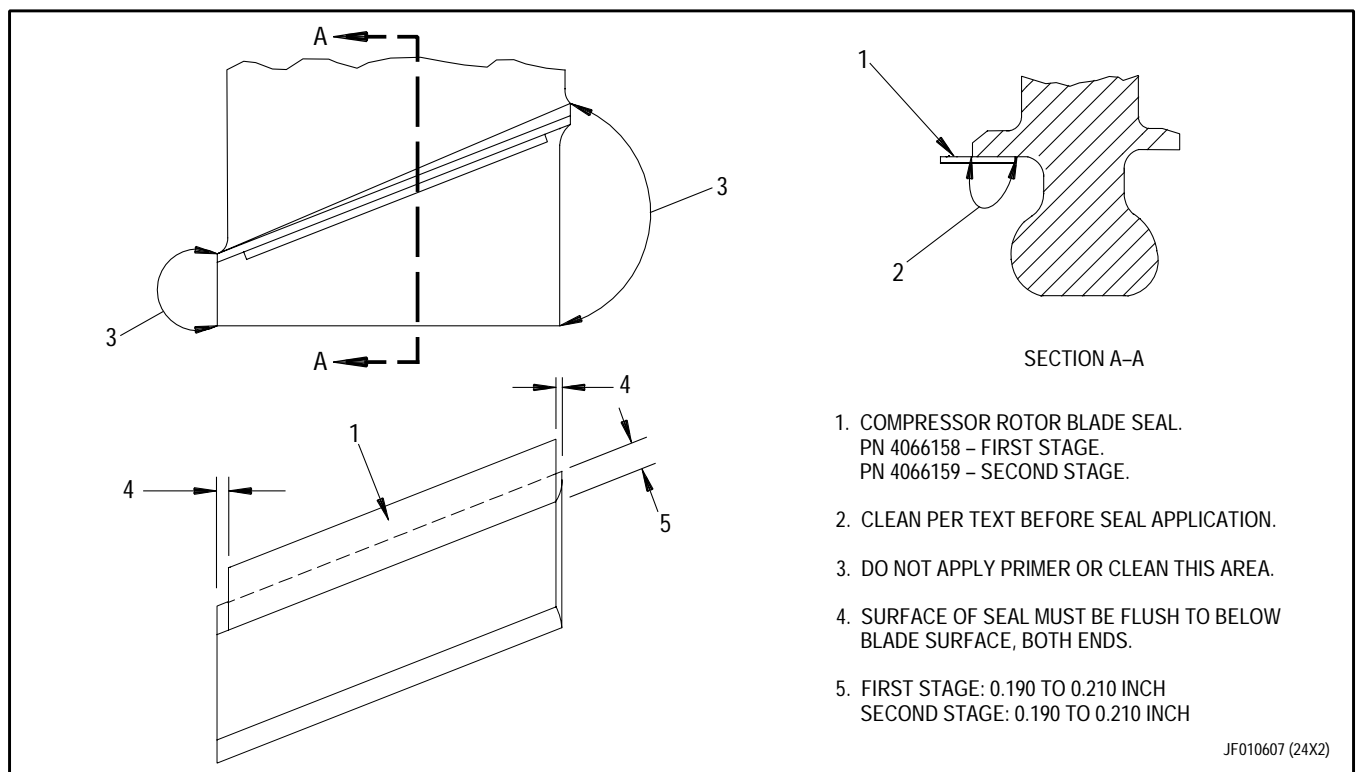


Figure 4. Front Compressor Rotor Blades - Seal Replacement

NOTE

- Apply adhesive primer within 30 minutes after cleaning.
- Dow Corning 1200 adhesive primer (PWA 556) may be used as an alternate to GE SS-4004 adhesive primer if GE SS-4004 primer is not available.
- d. Use clean unsized cheesecloth or soft bristle brush to apply thin coat of SS-4004 adhesive primer (PN 671798) to blade area shown. Do not shake primer before use. Pour out required amount for specific task. Air dry for one hour minimum.
- e. Roughen bonding surface of seal strip with No. 240 nonmetallic abrasive paper.
- f. Wipe bonding surface of seal strip with unsized cheesecloth dampened with isopropyl alcohol. Air dry for 10 minutes minimum.

NOTE

General Electric RTV 106 adhesive or DC3145 (PWA 617) silicone rubber sealant is an acceptable substitute if GE RTV 159 is not available.

- g. Apply 0.020 to 0.060 inch thick (prior to bond) coating of RTV 159 adhesive (PWA 36003) to underside of blade platform in bonding area(2) as shown. (See PWA 611 and PWA 615 in T.O. 2-1-111.)

NOTE

Variations in the amount of sealant used and pressure applied during seal strip application may result in beading or buildup of sealant and/or minor voids in the sealant at the edge of seal strips. These conditions are not cause for blade rejection. Security of bond is the critical area of concern. Check bond by using light force to attempt to remove the seal strip from blade. Pull at seal edges not at corners of seal. Seal strip should remain intact.

- h. Assemble seal strip blade root platform as shown, maintaining 0.025 to 0.050 inch bond line. When assembling seal strip to blade, do not apply excessive pressure on seal strip so as to squeeze adhesive from bond area. Adhesive thickness less than that specified can adversely affect bond strength. Remove excess adhesive from edge bonding area with clean wooden spatula, or equivalent.
- i. Cure per PWA 36003. (See T.O. 2-1-111.)

6. FRONT COMPRESSOR ROTOR BLADES - MOMENT-WEIGHT.

(See Figure 5 and Table 1.)

NOTE

Periodic checks shall be made with calibrated blade to ensure scale accuracy.

- a. Check table 1 for proper adapter and its matching counterweight for stage of blade to be moment-weighted.
- b. Verify that PWA 55456 tester has been previously calibrated per procedure outlined in manufacturer's manual.
- c. Check the bull's eye lever(11, figure 5). Adjust leveling feet(9) as required to level tester.
- d. Install proper blade adapter(2).
- e. Install proper calibrated blade into adapter by backing out locking screw(3), inserting blade, and tightening locking screw fingertight.

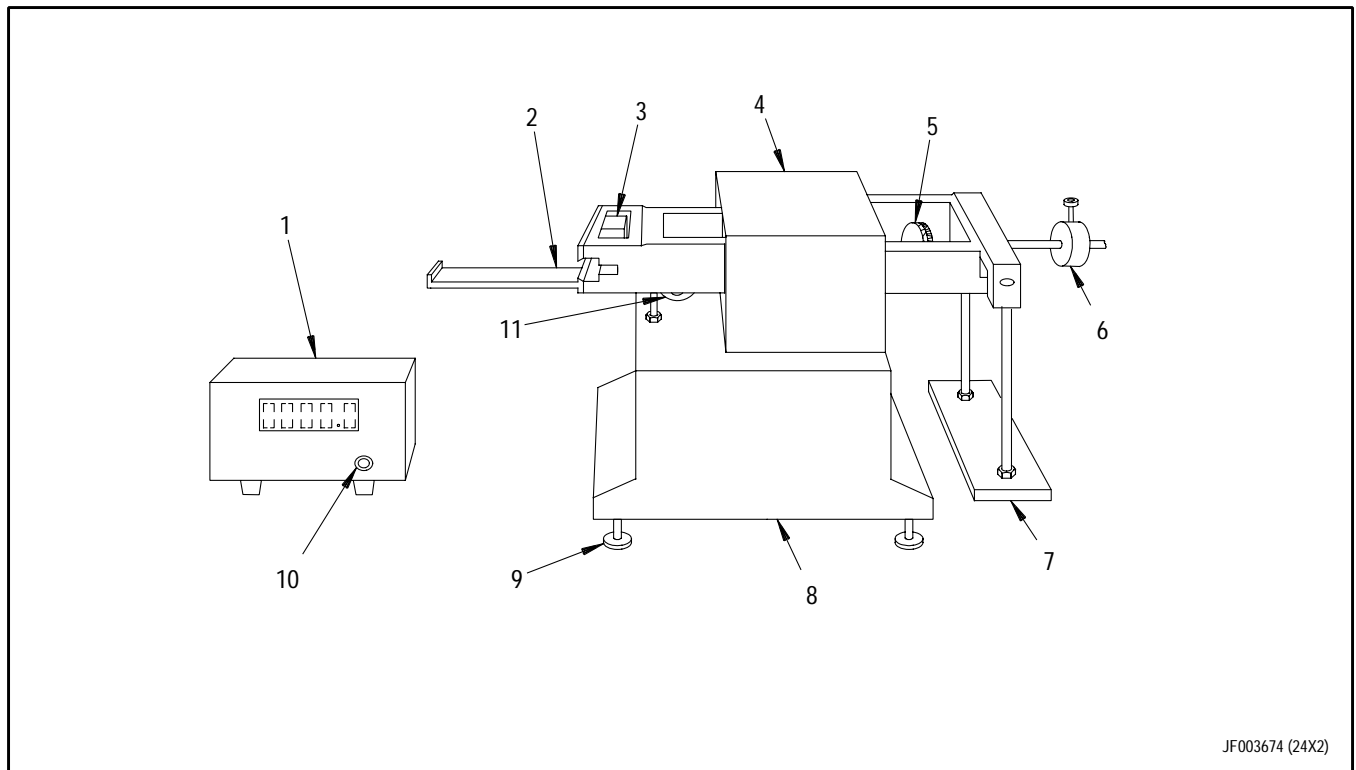


Figure 5. PWA 55456 Moment-weight Tester

Legend for figure 5

1. Digital readout
2. Blade adapter
3. Locking screw
4. Dust cover
5. Medium balance
6. Counterweight
7. Counterweight pan
8. Tester base
9. Leveling foot
10. Fine zero
11. Bull's eye level

Table 1. Front Compressor Rotor Blades - Moment-Weight Classification Tools

Scale	Blade Stage	Adapter	Master Blade
PWA 55456	1st fan	PWA 57676	TBD
PWA 55456	2nd fan	PWA 57677	TBD
PWA 55456	3rd fan	PWA 57678	TBD

- f. Mark location of locking screw knurled knob. Back out locking screw 1/4 to 1/2 turn and remove calibrated blade. Turn locking screw back into marked location.
- g. Turn on digital readout(1) and allow 15 minutes for warmup to ensure accurate calibration.
- h. Center the fine zero knob(10) on digital readout panel by turning knob counterclockwise to the stop, then clockwise, counting total number of turns of knob to the stop. Now turn counterclockwise one-half the number of full and fractional turns.
- i. Remove any counterweights from counterweight hanger pan(7).
- j. Select coarse balance counterweight(6) and install on proper coarse balance rod. Adjust coarse balance weight until initial balance of 10.00 ounce-inches or less is obtained.
- k. Adjust knurled weights inside main lever at rear of tester to obtain medium balance of 2.00 ounce-inches or less.
- l. Adjust fine zero knob on the digital readout to read 0.00 \pm 0.01 ounce-inch or better.
- m. Install calibrated blade. If blade is heavier than 100.00 ounce-inches, place 10.00 ounce counterweight on the counterweight hanger pan.
- n. Reading on digital readout should equal weight reading marked on calibrated blade within \pm 0.002 ounce-inch. If not, recalibrate tester.

- o. Install blades to be moment-weighed one at a time. Record moment-weight reading from digital readout.
- p. Remove blade and mark reading on blade using nonetching ink, layout dye, or silver pencil.

7. COMPRESSOR ROTOR BLADES(STAGES ONE THROUGH THREE) BLADE ROOT - PLASMA SPRAY COATING(PWA 53-69) STRIP AND RECOAT.

(See Figures 6 and 7 and Table 2.)

- a. Remove rubber seal strip from blade platform(first and second stages only) per paragraph 5.
- b. Strip antigalling compound from blade root by immersing in aqueous solution cleaner, PS-110. Refer to T.O. 2-1-111, SPOP 710.
- c. Mask blade midspan shroud hardcoat area(first and second stages only). Refer to T.O. 2-1-111, SPOP 36.
- d. Strip coating from fan blade root. See figure 6. Refer to T.O. 2-1-111, SPOP 710.
- e. Remove masking from blade.
- f. Visually inspect blade root with 3X minimum magnifying glass for galling/fretting. See WP 315 00 for serviceable limits.
- g. Fluorescent penetrant inspect blade root per SPOP 776 to SFPS-M, using ZL-37 penetrant. See WP 315 00. No cracks allowed. Refer to T.O. 2-1-111.
- h. If reparable limits are exceeded, hold blade for disposition; if limits are not exceeded, continue with recoating process.
- i. Shotpeen stages 1 through 3 blade root as follows:

- (1) Install and secure PWA 71091 shotpeen fixture on PWA 70449 pedestal.
- (2) Install applicable plate adapter on PWA 71091 fixture per table 2.
- (3) Cycle test specimen through shotpeen cycle as follows:(See table 2.)
 - (a) Install eight applicable test piece holders into any eight of 16 holes in applicable adapter.
 - (b) Install applicable shotpeen masks into remaining holes in adapter to protect adapter and shotpeen fixture during verification process.

NOTE

Following procedure allows grit blast/plasma spray of only one side of blade root. Blade must be inverted and procedure repeated for opposite side of blade.

- (c) Secure 12 test strips A(0.051 inch thickness) to test strip holders.
- (d) Position nozzles to shotpeen all 12 test strips using SAE 170 maximum cast shot having hardness of 45 to 55 HRC to 10A intensity per AMS 2430. Refer to T.O. 2-1-111, SPOP 501.
- (e) Using almen test strip gage, measure test strips for proper intensity.

- (4) Install applicable shotpeen mask per table 2 and the following instructions:

- (a) Install shotpeen mask and installed blade into one of 16 holes in adapter. Ensure that timing mark on shotpeen mask engages properly into timing mechanism on adapter. Continue until all 16 holes are filled with rubber masks.

- (b) Locally mask identification and cycle marking code as required, if present, and top of blade root using four layers of PMC 4134 masking tape. Refer to T.O. 2-1-111. See figure 7.

j. Shot peen blade root per AMS 2430 with intensity 10A using SAE 170 maximum cast shot having hardness of 45 to 55 HRC. See figure 6. Refer to T.O. 2-1-111, SPOP 501.

k. Remove shot peen masking.

l. Set up grit blast/plasma spray tooling for blades as follows:

- (1) Install applicable plasma spray mask(table 2) on rotating table.

NOTE

Following procedure allows grit blast or plasma spray of only one side of blade root. Blade must be inverted and procedure repeated for opposite side.

- (2) Load applicable stage blades into applicable mask fixture as follows:

- (a) Remove detail-4 cover and five detail-3 templates.

- (b) Ensure that mid span shroud rests on detail-5 nylon pad, and blade root is square against detail-2 block. Load 20 blades into detail-2 blocks with blade root in block slot and blade tip against detail-10 tubing. If necessary, depress tubing with finger to allow blade tip to engage.

- (c) Install detail-13 template. Engage aligning pins into holes in detail-2 block, so that template slots are directly over blade root.

- (d) Install detail-4 cover while engaging onto four detail-18 studs.(Cover rests on templates.)

(3) Grit blast blades using 60 grit at 30 PSI.

(4) Remove detail-4 cover and detail-13 template and turn blades 180 degrees. Reinstall templates and cover, and grit blast blades using 60 grit at 30 PSI.

(5) Measure and record dimension of each blade root, using PWA 70836 gage. Temporarily number each blade in sequence for later reference.

- (a) Zero PWA 70836 gage using gage standard set master applicable detail(table 2).

- (b) Lift indicator contact point by pushing down on indicator lever.

- (c) Insert blade root into gage.
- (d) Wiggle blade tip to obtain minimal reading.
- (e) Record reading as Measurement A.
- (6) Remove detail-4 cover and detail-13 template. Install detail-3 template and detail-4 cover for plasma spray operation.
- m. Plasma spray blade root per PWA 53-69, 0.0015 to 0.0030 inch thickness. See figure 6. Refer to T.O. 2-1-111.
- n. Remove detail-4 cover and detail-3 template and turn blades 180 degrees. Reinstall template and cover and plasma spray opposite side of blades, 0.0015 to 0.0030 inch thickness per figure 6.
- o. Measure thickness of blade root (Measurement B). Subtract Measurement A from B to obtain plasma spray thickness. Thickness shall be 0.0021 to 0.0042 inch.
- p. If plasma spray thickness limits are not met, apply more coating. If limits are exceeded, strip coating and repeat steps i. through p. Refer to T.O. 2-1-111, SPOP 710.
- q. Remove masking.
- r. Inspect plasma spray coating. Refer to T.O. 2-1-111.
- s. Bond seal strip to blade platform per paragraph 5.
- t. Apply PWA 36545 antigalling compound per paragraph 4.

Table 2. Compressor Rotor Blades (Stages One Through Three) Blade Root - Shotpeen and Plasma Spray Tools

Compressor Blade Stage	Shotpeen Fixture	Plate Adapter	Shotpeen Mask	Shotpeen Test Piece Holder	Grit Blast/ Plasma Spray Mask	PWA 70836 Thickness Gage Master
1	PWA 71091	PWA 71092	PWA 70841	PWA 70844	PWA 70835	Detail-19
2	PWA 71091	PWA 71093	PWA 70842	PWA 70845	PWA 70837	Detail-20
3	PWA 71091	PWA 71093	PWA 70843	PWA 70846	PWA 70839	Detail-21

Legend for figure 6

1. Coat both sides with PWA 53-69 per text.
2. Coating overspray permitted but must taper out smoothly on both sides in these areas.
3. No coating allowed, both sides.
4. Grit blast, both sides.
5. No grit blast, both sides.

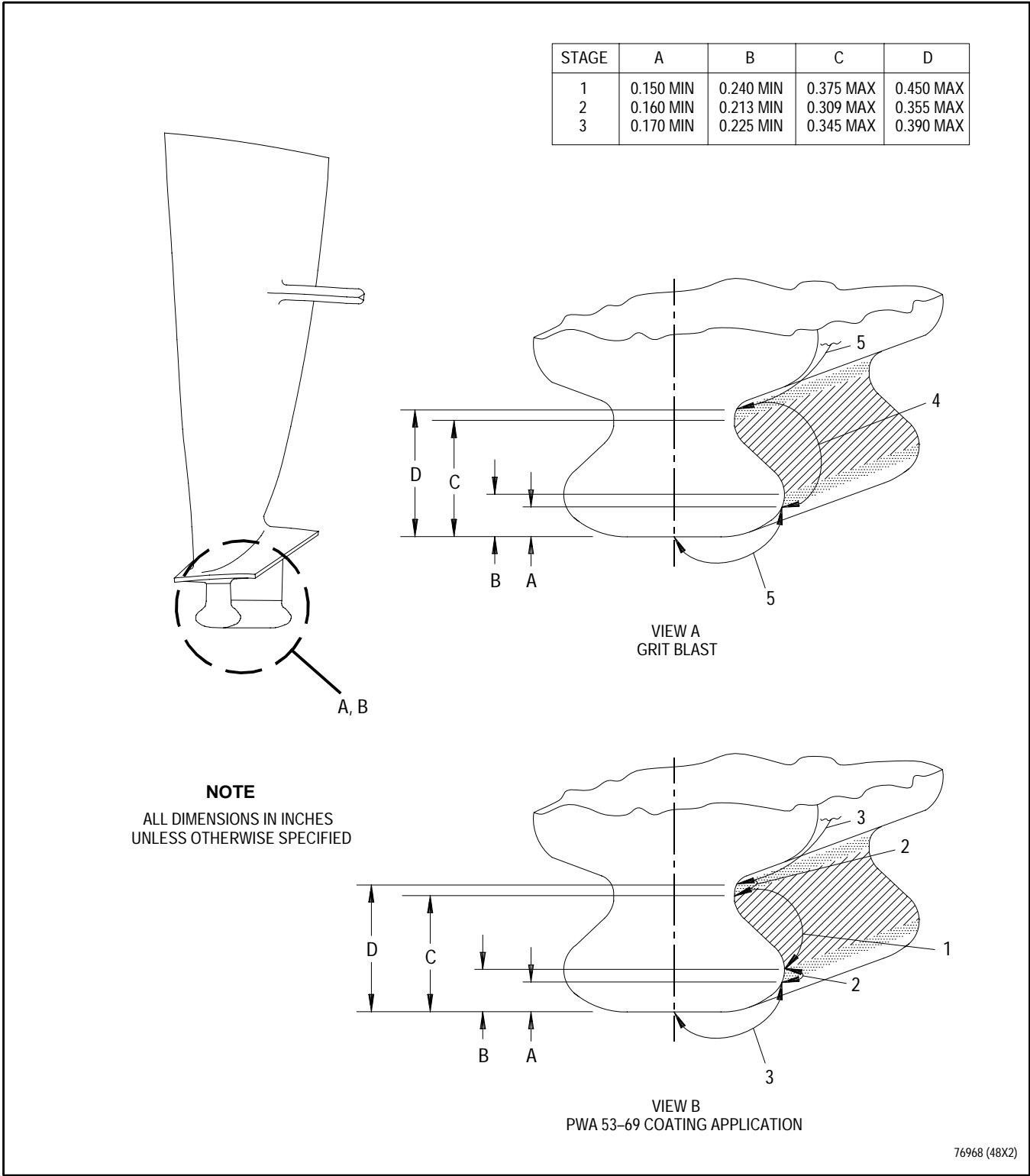


Figure 6. Compressor Rotor Blades (Stages One Through three) - Grit Blast and PWA 53-69 Coating Application

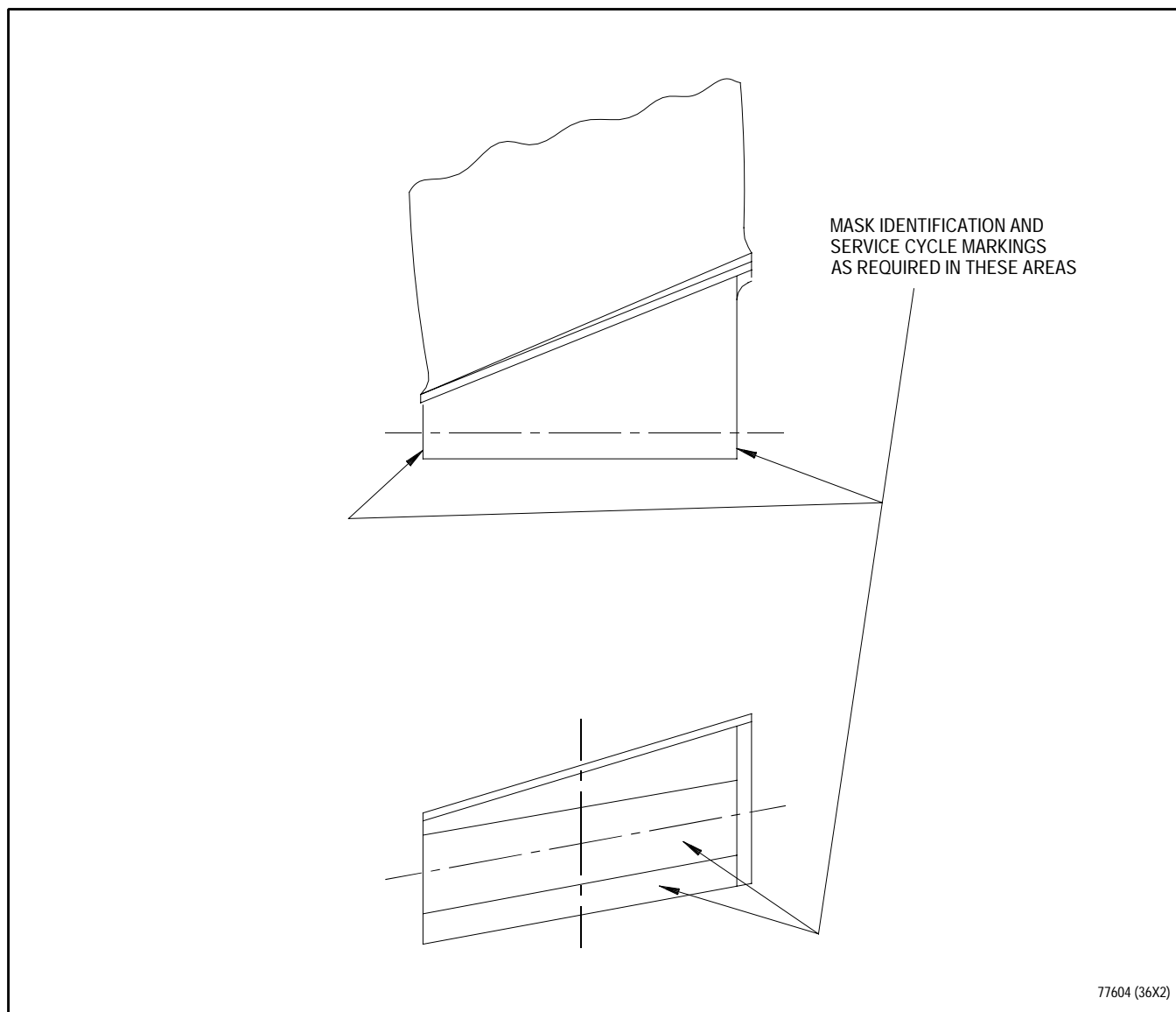


Figure 7. Compressor Rotor Blades (Stages One Through Three) - Masking Identification Areas

8. COMPRESSOR ROTOR BLADES (STAGES ONE THROUGH THREE) - PLATFORM BLEND REPAIR.

(See Figures 8 through 13 and table 2.)

- a. If necessary, protect midspan shroud hardcoat area (1st and 2nd stages only) during repair by masking. Refer to T.O. 2-1-111, SPOP 36.
- b. If necessary, remove rubber seal from blade platform (1st and 2nd stages only) per paragraph 5.
- c. If necessary, remove antigallant from blade root per paragraph 4 and PWA 53-69 from blade root per paragraph 7.



- Use of aluminum oxide abrasives may cause stress corrosion of titanium and use of wire brushes may contain rust which can cause stress corrosion and may also produce surface scratches/damage.
- Avoid contact with airfoil during platform blending to prevent airfoil scratches which may result in additional blending/polishing repair.

NOTE

No repair allowed in airfoil radius or root radius.

- d. Blend repair damage on platform at following locations, using only hand stones, files, and silicon carbide abrasive cloth dedicated for use on titanium. Do not attempt to remove damage by straightening. Refer to SPOP 532.
 - (1) Repair platform airfoil side and root side per figure 8.
 - (2) Scallop blend repair platform edges per figure 9.

- (3) Blend repair platform corners per figure 10.

- (4) Blend repair platform upper edge per figure 11.

NOTE

Leading and trailing edges (LE, TE) can be machine ground. Refer to T.O. 2-1-111, SPOP 530.

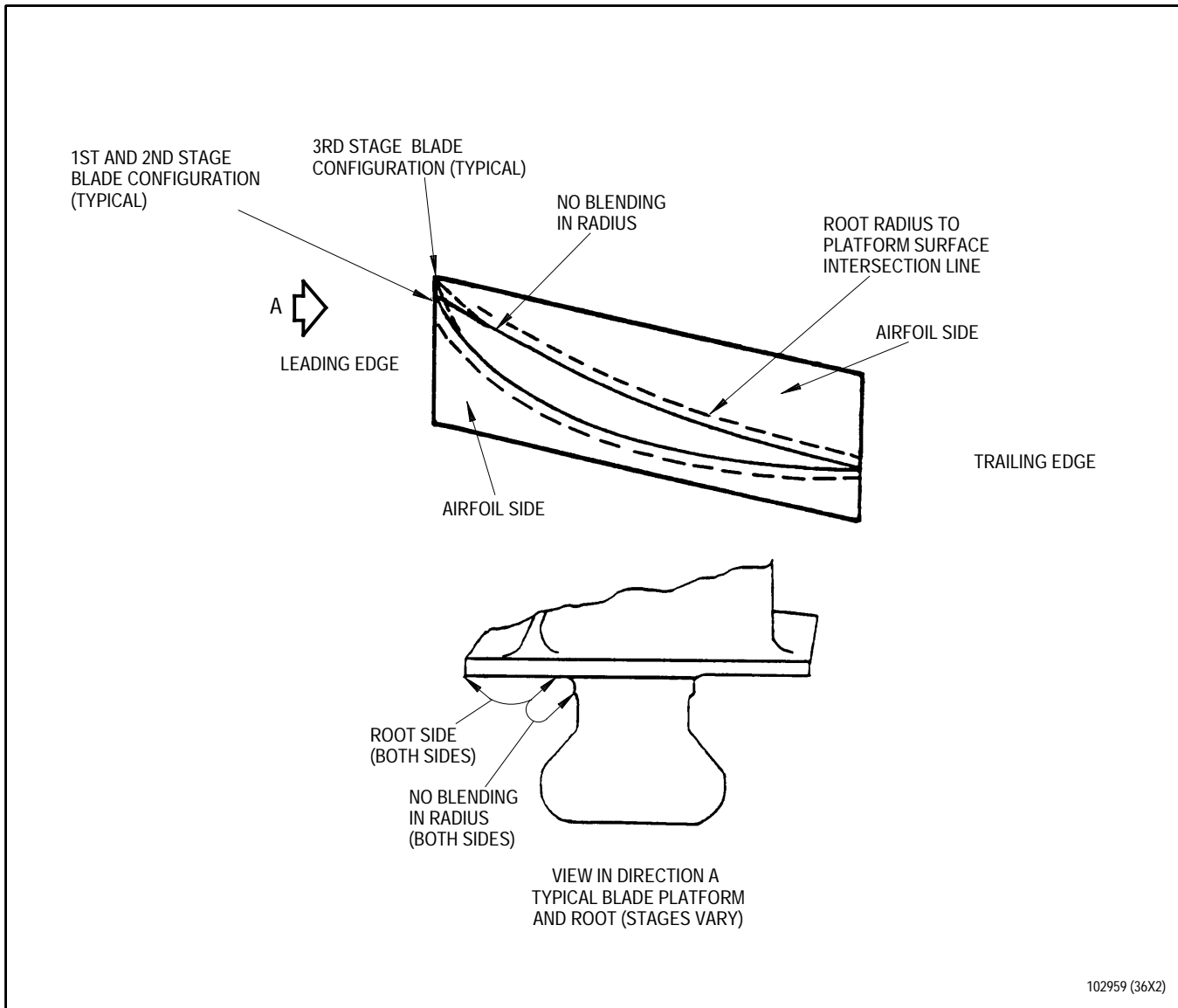
- e. Surface machine platform leading and trailing edges. (See figure 12.)
- f. Inspect repair area(s) as follows:
 - (1) Visually verify repair has completely removed damage and is within specified limits.
 - (2) Visually determine repair surface finish is equivalent to or smoother than adjacent parent material (125 Ra or better).
 - (3) Fluorescent penetrant inspect per T.O. 2-1-111, SPOP 84 and SFPS-M, except no indications allowed.
- g. Shotpeen repaired platform as follows:
 - (1) For test specimens install and secure PWA 71091 shotpeen fixture on PWA 70449 pedestal.
 - (2) Install applicable plate adapter on PWA 71091 fixture per table 2.
 - (3) Cycle test specimen through shotpeen cycle as follows: (See table 2.)
 - (a) Install eight applicable test piece holders into any eight of 16 holes in applicable adapter.

- (b) Install applicable shotpeen masks into remaining holes in adapter to protect adapter and shotpeen fixture during verification process.

NOTE

The following procedure allows shotpeen of only one side of blade. Blade must be inverted and procedure repeated for opposite side of blade.

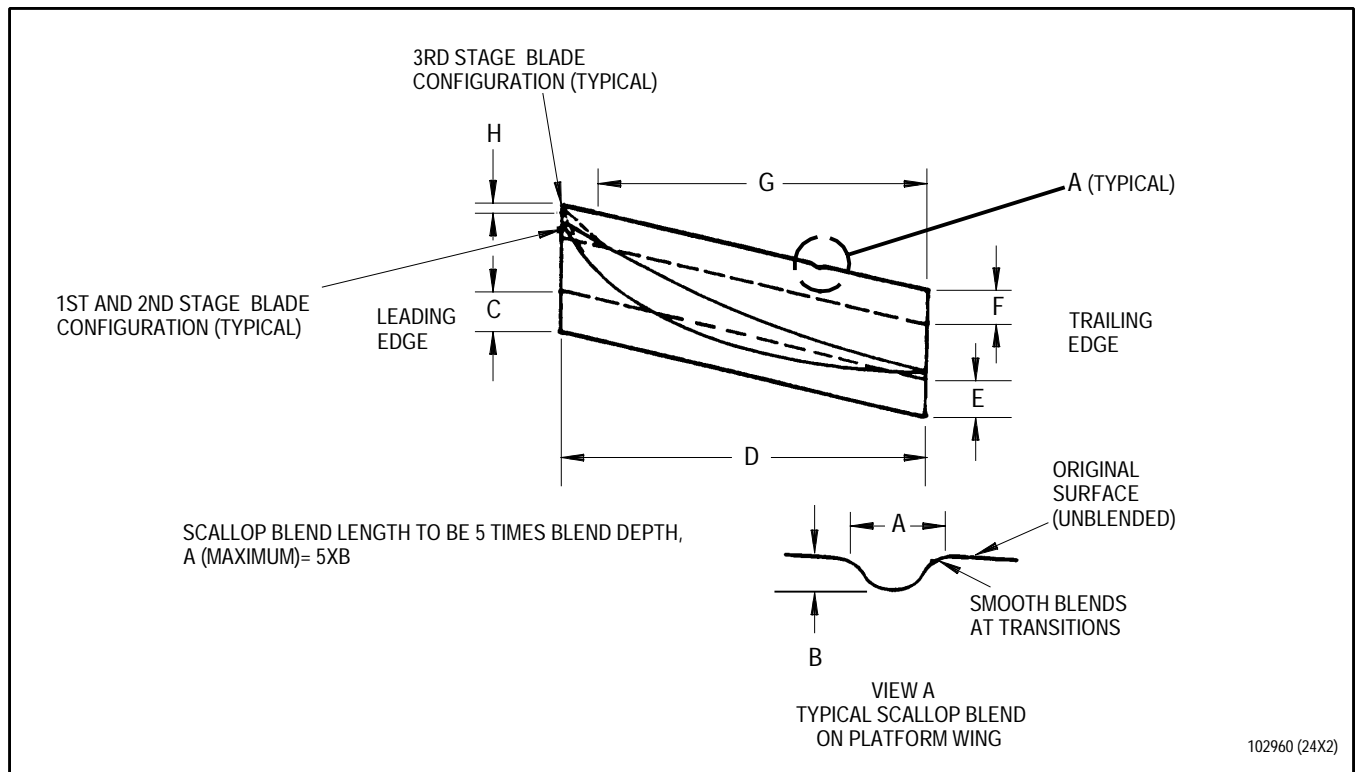
- (c) Secure 12 test strips, A type (0.051 inch thickness) to test strip holders.
- (d) Position nozzles to shotpeen all 12 test strips using SAE 170 maximum cast shot having hardness of Rockwell C45 to C55 to 10A intensity per AMS 2430. Refer to T.O. 2-1-111, SPOP 501.
- (e) Using Almen test strip gage, measure test strips for proper intensity. Refer to T.O. 2-1-111, SPOP 501.
- h. Mask blade and install masked blade into shotpeen fixture as follows:
 - (1) Install applicable shotpeen mask per table 2 and install blade into one of 16 holes in adapter. Ensure that timing mark on shotpeen mask engages properly into timing mechanism on adapter. Continue until all 16 holes are filled with rubber masks.
 - (2) If present, locally mask identification and cycle
- marking code as required, and top of blade root using four layers of PMC 4134 masking tape. Refer to T.O. 2-1-111.
- i. Shotpeen blade root and repaired platform per figure 13 and per AMS 2430 with intensity 10A using SAE 170 maximum cast shot having hardness of Rockwell C45 to C55. Refer to T.O. 2-1-111, SPOP 501.
- j. Shotpeen airfoil side of platform per figure 13 and per AMS 2430 with intensity of 15N. Ensure midspan shroud is masked to protect hardface from peening. Continue peen onto airfoil. Airfoil may be completely peened. Alternatively, airfoil may be partially peened (peening feathered) on airfoil so long as a distinct stopping point (line of demarcation) does not occur and distortion of LE and TE does not occur.
- k. Remove shotpeen masking and midspan shroud masking.
- l. Inspect shotpeen areas for curled material. None is allowed
- m. Plasma spray Cu-Ni onto root areas per paragraph 7.
- n. If required, remove masking from midspan shroud hard coat area.
- o. If required, bond new rubber seal to blade platform per paragraph 4.
- p. Apply antigalling compound to blade root per paragraph 4.



Blend Limits

- 0.020 inch maximum depth
- Blend length greater than five times blend depth
- Blend shall not extend into adjacent radius.
- Blend shall not be opposite previous blend on airfoil side or root side to maintain platform wall thickness.

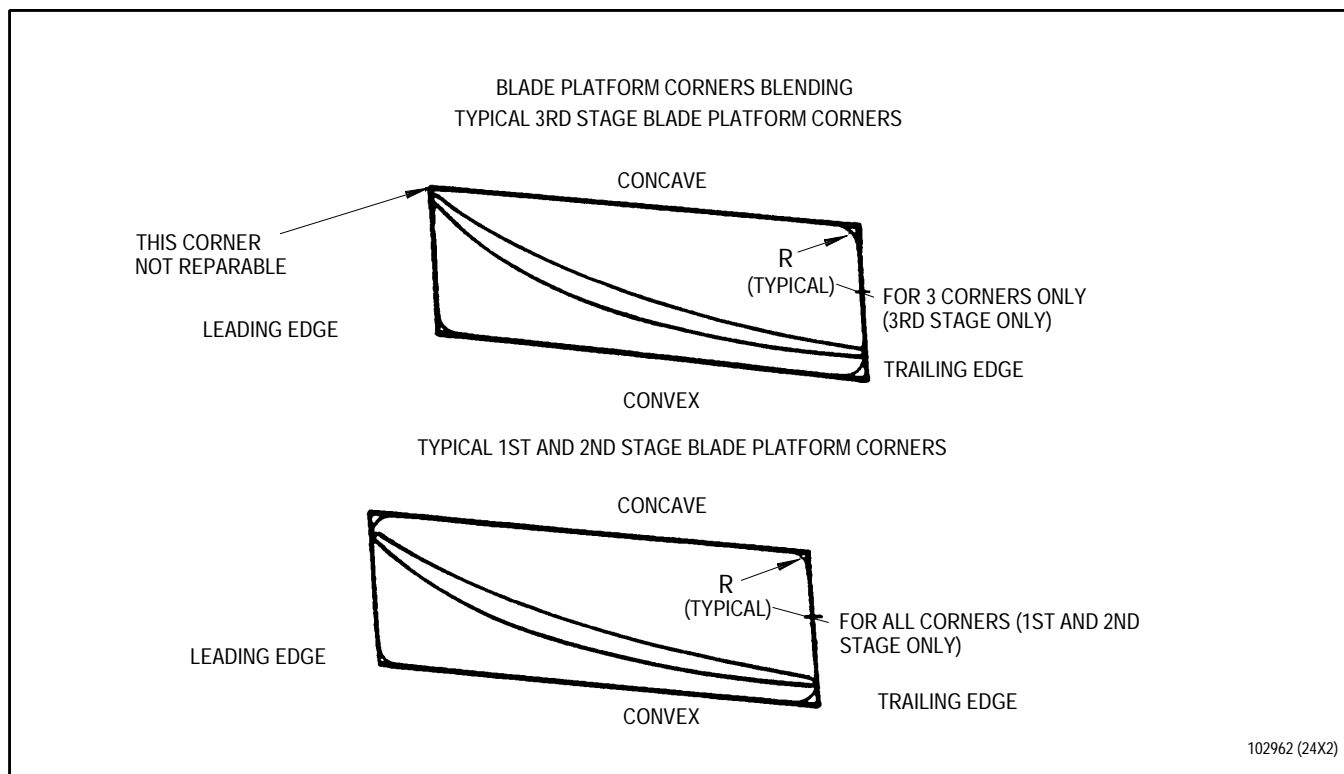
Figure 8. Compressor Rotor Blades - Platform Airfoil Side and Root Side Blend Repair



Distances C, E, and F are defined from radius of blade root located on the opposite side of blade platform (as shown by hidden line). Distance H is defined from leading edge of airfoil. Distances will differ for each stage. No blending allowed in non-designated platform edge areas.

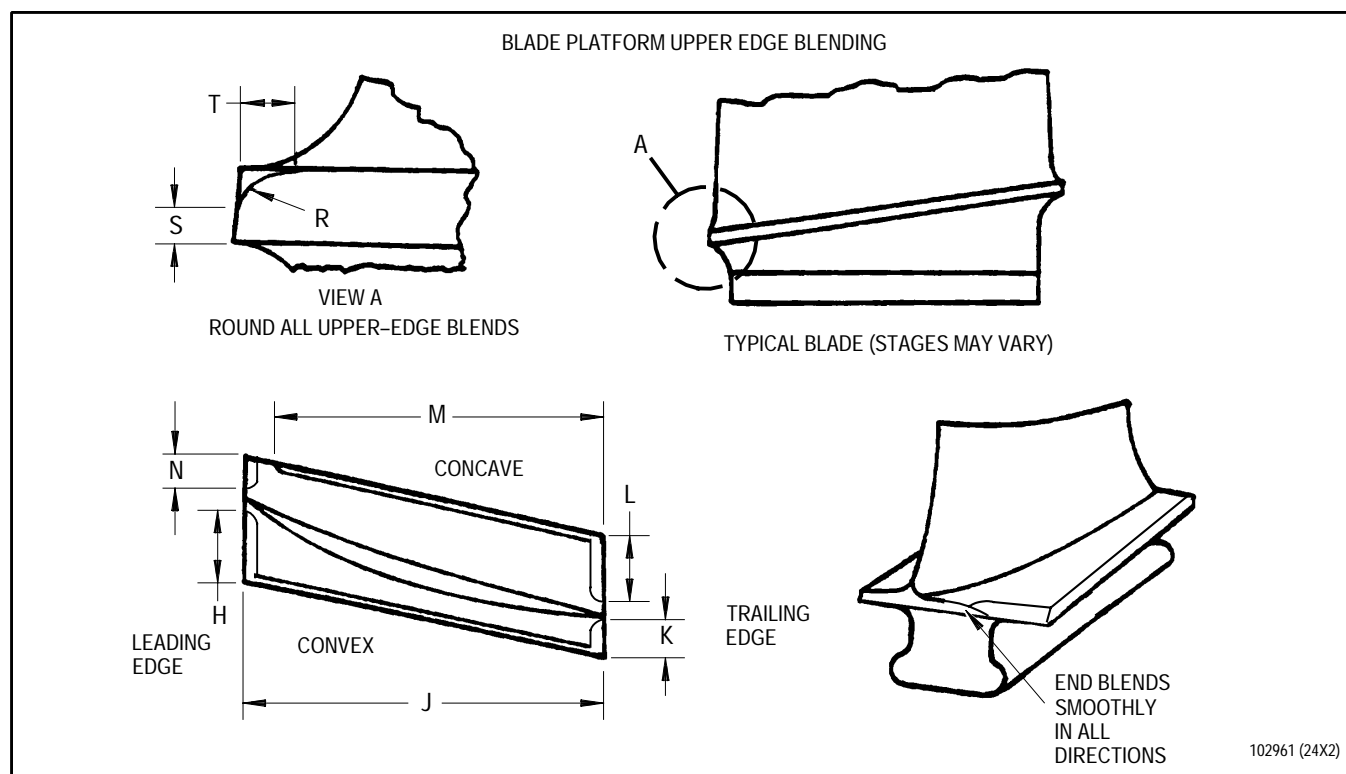
Area(s)	Blend Limits	Remarks
C, E, F, H	0.020 inch maximum depth (B)	Shotpeen blade and blended area after blend repair.
D, G	0.020 inch maximum depth (B)	Shotpeen not required. Stages 1 and 2 - area G is entire edge. Stage 3 - area G starts 0.250 inch from leading edge corner of platform.

Figure 9. Compressor Rotor Blade Platform Edges - Scallop Blend Repair



Round platform corners to 0.125 inch maximum radius. Leading edge concave corner of first and second stage blade platforms may be rounded. Leading edge concave corner of third stage blade platform may not be rounded.

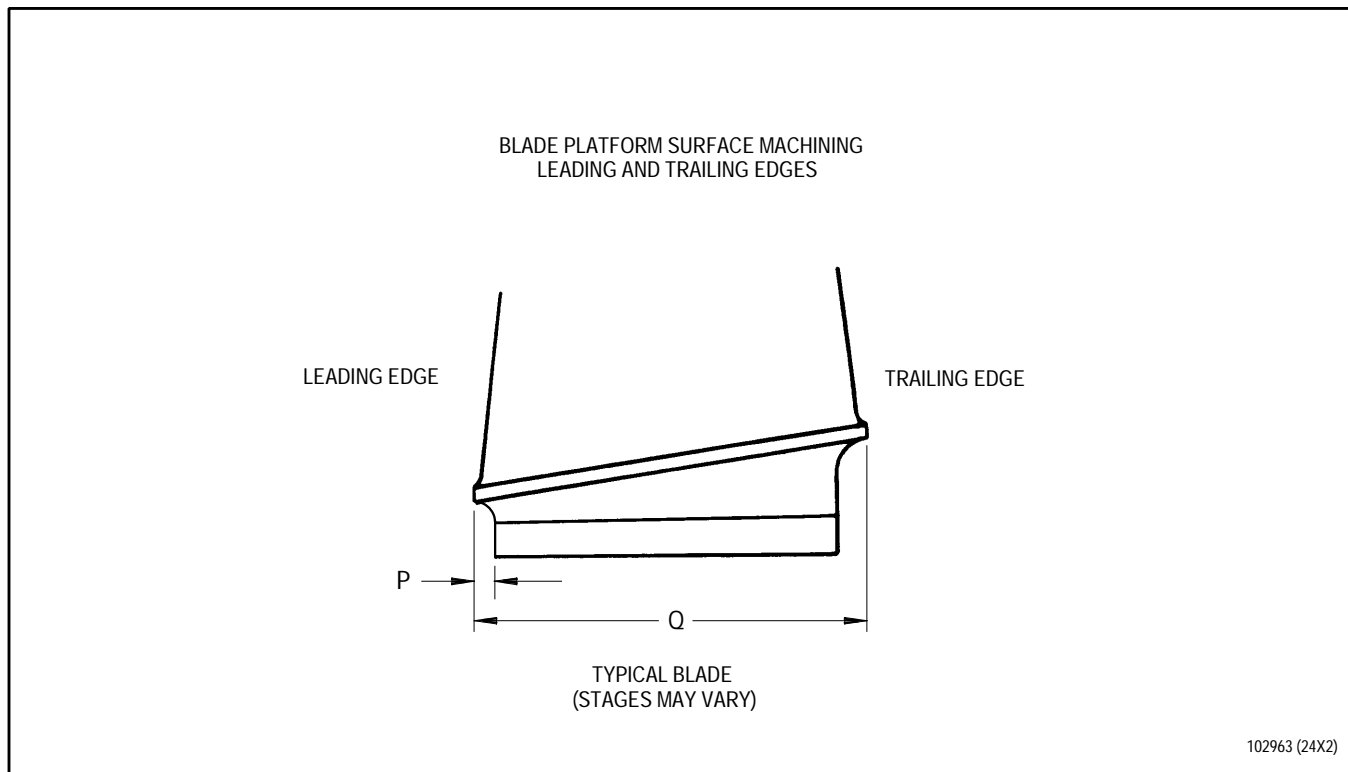
Figure 10. Compressor Rotor Blade Platform Corners - Blend Repair

**NOTE**

No blending allowed in non-designated platform edge areas. Do not blend in or into airfoil radius or where leading and trailing edges intersect platform.

Area	First Stage	Second Stage	Third Stage	Remarks
H	0.700 inch maximum	0.500 inch maximum	0.300 inch maximum	Shotpeen required
J	Allowed along entire edge	Allowed along entire edge	Allowed along entire edge	No shotpeening required
K	0.600 inch maximum	0.400 inch maximum	0.200 inch maximum	Shotpeen required
L	0.150 inch maximum	0.200 inch maximum	0.150 inch maximum	Shotpeen required
M	Entire edge	Entire edge	Starts 0.300 inch from leading edge corner	No shotpeening required
N	None allowed	None allowed	None allowed	Not reparable, replace blade
R	0.055 inch maximum	0.055 inch maximum	0.055 inch maximum	-
S	0.030 inch maximum	0.030 inch maximum	0.030 inch maximum	-
T	0.100 inch maximum	0.100 inch maximum	0.100 inch maximum	-

Figure 11. Compressor Rotor Blade Platform Upper Edge - Blend Repair

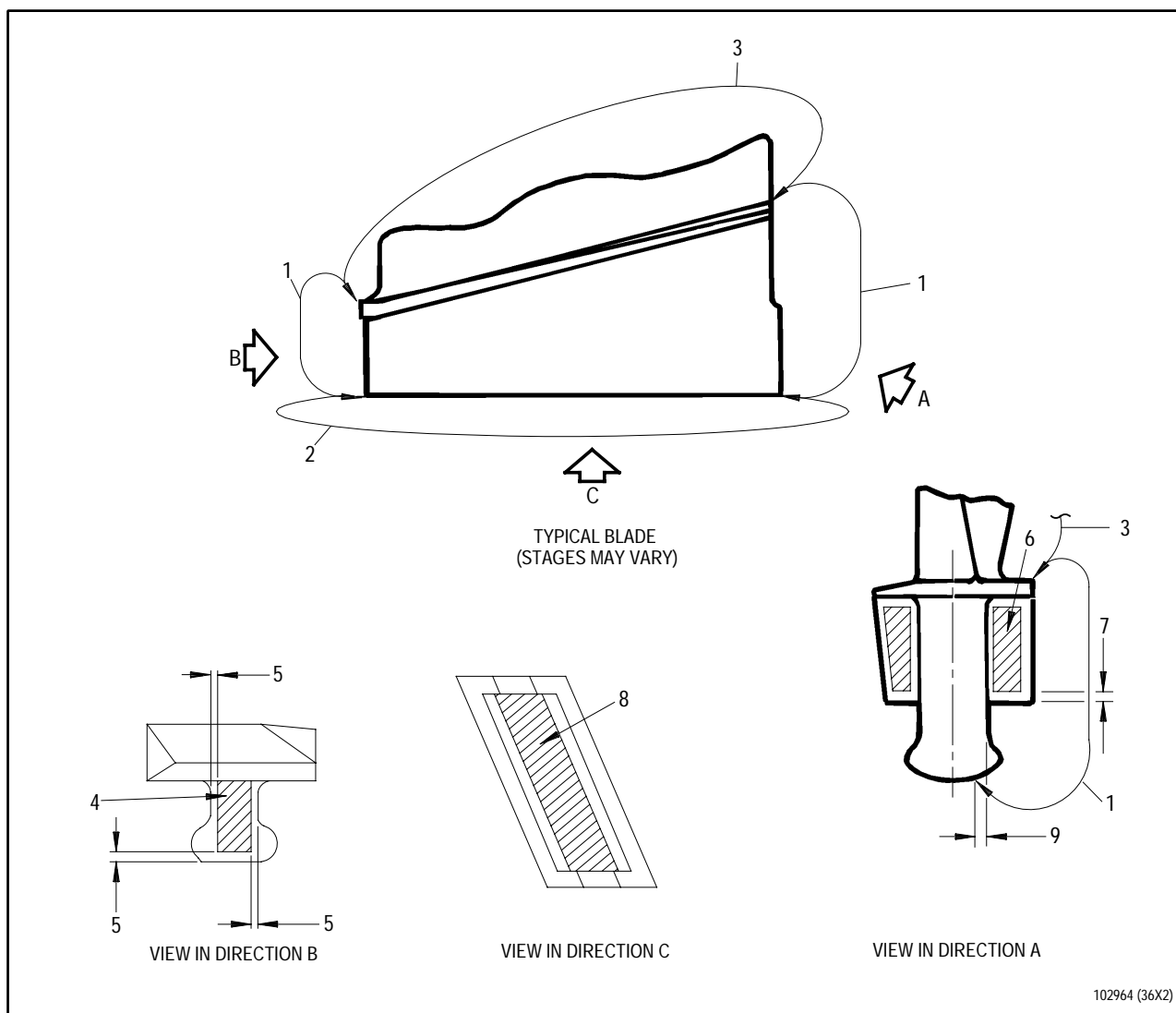


First Stage	Second Stage	Third Stage	Remarks
Dim.P, not applicable	Dim.P, 0.177 inch minimum	Dim.P, 0.140 inch minimum	Dim. are after machining. Shotpeen after machining.
Dim.Q, 3.374 inch minimum	Dim.Q 2.496 inch minimum	Dim.Q 2.056 inch minimum	Dim. are after machining. Shotpeen after machining.

NOTE

- Platform leading edges may be machined to remove small nicks and dents, except leading edge of first blade.
- Both P and Q dimension requirements must be maintained; break machined edges 0.005 to 0.015 inch.
- Fluorescent penetrant inspect and shotpeen after machining per applicable section of this paragraph.
- Distance Q is to be measured from "blade platform no blend area" defined in figure 9.

Figure 11A. Compressor Rotor Blade Platform Leading And Trailing Edges - Surface Machining



1. Shotpeen root, root side of platform, and platform edges per paragraph 8.
2. Shotpeen optional and may be incomplete.
3. Shotpeen airfoil side of platform and onto airfoil per paragraph 8.
4. Mask if cycle marking is present.
5. 0.040 to 0.100 inch.
6. Mask if marking is present, both sides.
7. 0.063 inch all around both sides.
8. Mask if marking is present.
9. 0.050 inch min. both sides, stage 1
0.085 inch min. both sides, stage 2
0.097 inch min. both sides, stage 3

Figure 12. Compressor Rotor Blades (Stage One Through Three) Platform - Shot Peening And Masking Identification Areas

WORK PACKAGE**TECHNICAL PROCEDURES****SEAL, AIR, FAN (FIRST, SECOND, AND THIRD STAGES) -****REPAIR****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 36

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
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6	19	19	19	29 - 36	18
7 - 9	18				

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
Silicone Rubber (PWA 407) - General Storage, Preparation and Application Instructions - - - - -	WP 100 00
PWA 52879 Checking Fixture - Nondestructive Test for Rubber to Metal Bond Nondestructive Inspection - - - - -	WP 101 00
Qualified Repair Source List (QRSI) - - - - -	WP 602 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
ACETONE	O-A-51
ALCOHOL, ISOPROPYL PMC 9094)	TT-I-735
COMPOUND, SILICONE RUBBER	PWA 407
COMPOUND, SILICONE RUBBER	RTV 102/103 OR 732
PRIMER, ADHESIVE/SEALANT (PWA 556)	DC1200
CHEESECLOTH	GA100-2
CLOTH, ABRASIVE, CROCUS	P-C-458
GLOVES, LINT FREE	-
PAPER, KRAFT 50 POUND (PMC 4128)	MEDIUM DUTY KRAFT
PLASTIC/TEFLON STOCK	1/16 TO 3/8 INCH THICK
TAPE, MASKING, METALLIC (LEAD	SCOTCH NO. 421
FOIL) (PMC 4138)	

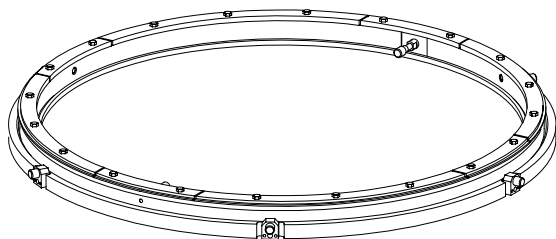
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

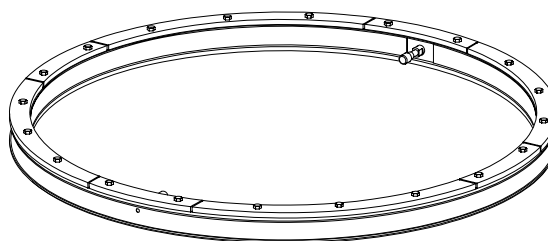
Paragraph	Function - Tool Nomenclature	Tool Number
4	FIRST STAGE FAN AIR SEAL - SILICONE RUBBER REPLACEMENT	
	FIXTURE, WATERJET, 1ST STAGE FAN AIRSEAL - - - - -	PWA 71281
	ADAPTER, WATERJET, UNIVERSAL - - - - -	PWA 71296
	FIXTURE, MOLD, 1ST STAGE FAN AIRSEAL REAR - - - - -	PWA 70592
	FIXTURE, MOLD, 1ST STAGE FAN AIRSEAL FRONT - - - - -	PWA 70591
5	SECOND STAGE FAN AIR SEAL-SILICONE RUBBER REPLACEMENT	
	FIXTURE, WATERJET, 2ND STAGE FAN AIRSEAL - - - - -	PWA 71282
	ADAPTER, WATERJET, UNIVERSAL - - - - -	PWA 71296
	FIXTURE, MOLD, 2ND STAGE FAN AIRSEAL REAR - - - - -	PWA 70594
	FIXTURE, MOLD, 2ND STAGE FAN AIRSEAL FRONT - - - - -	PWA 70593
6	THIRD STAGE FAN AIR SEAL-SILICONE RUBBER REPLACEMENT	
	FIXTURE, WATERJET, 3RD STAGE FAN AIRSEAL - - - - -	PWA 71283
	ADAPTER, WATERJET, UNIVERSAL - - - - -	PWA 71296
	FIXTURE, MOLD, 3RD STAGE FAN AIRSEAL REAR - - - - -	PWA 70596
	FIXTURE, MOLD, 3RD STAGE FAN AIRSEAL FRONT - - - - -	PWA 70595

ILLUSTRATED SUPPORT EQUIPMENT



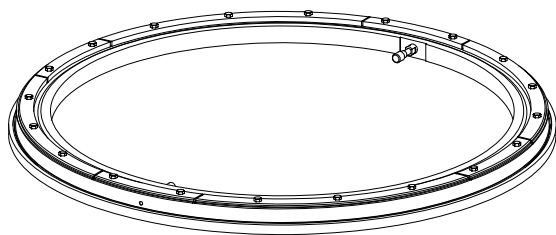
PWA 70591 -C

Figure T1. PWA 70591 FIXTURE



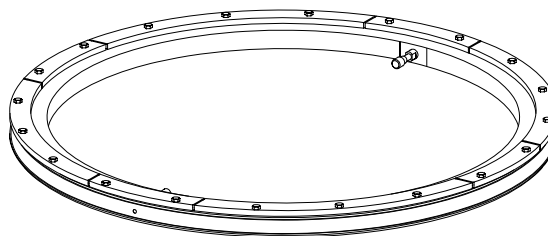
PWA 70592 -C

Figure T2. PWA 70592 FIXTURE



PWA 70593 -C

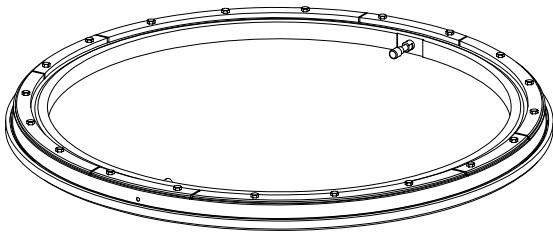
Figure T3. PWA 70593 FIXTURE



PWA 70594 -C

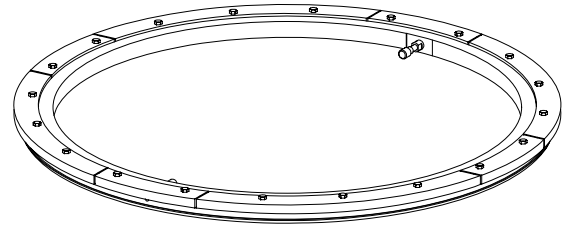
Figure T4. PWA 70594 FIXTURE

ILLUSTRATED SUPPORT EQUIPMENT (continued)



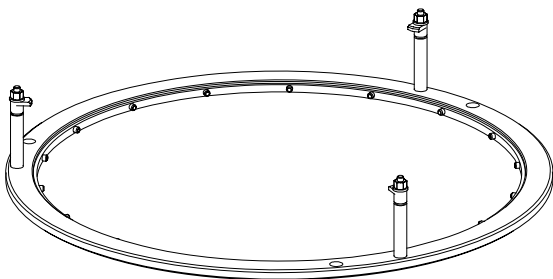
PWA 70595 -C

Figure T5. PWA 70595 FIXTURE



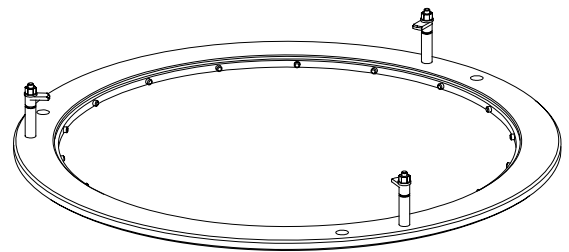
PWA 70596 -C

Figure T6. PWA 70596 FIXTURE



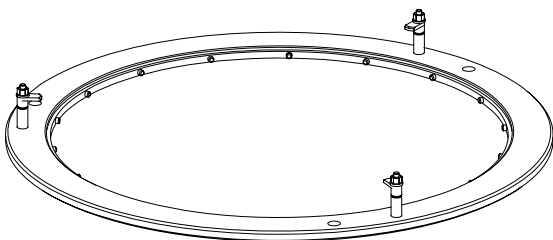
PWA 71281 -C

Figure T7. PWA 71281 FIXTURE



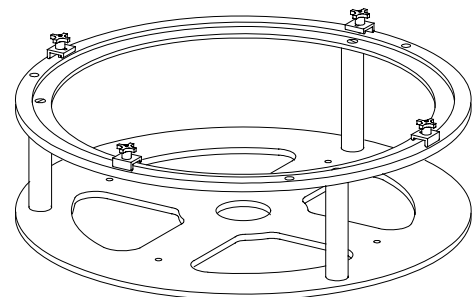
PWA 71282 -C

Figure T8. PWA 71282 FIXTURE



PWA 71283 -C

Figure T9. PWA 71283 FIXTURE



PWA 71296 -C

Figure T10. PWA 71296 ADAPTER

1. INTRODUCTION.

- a. This work package contains instructions for repair of first, second, and third stage fan air seals.

2. FIRST, SECOND, AND THIRD STAGE FAN AIR SEAL-RUBBER PATCH REPAIR

(See Figure 1.)



Use care to avoid damaging base metal when removing rubber.

- a. Remove all loose and disbonded rubber around affected areas using a sharp knife and plastic/teflon tools or equivalent.
- b. Clean areas to be repaired as follows:
 - (1) Wipe with clean, unsized cheesecloth moistened with isopropyl alcohol.
 - (2) Dry thoroughly in air or in oven at 250°F(121°C) maximum.

NOTE

RTV 103 (black) is the preferred adhesive sealant.

- c. Apply RTV 102,103, or DC 732 adhesive sealant to prepared area(s), using 1/16 to 3/8 inch thick teflon strip, as follows:



- Care shall be taken during application to keep applicator nozzle tip opening completely submerged in sealant to reduce the risk of introducing voids or air pockets with repeated removal/insertion of the applicator nozzle.
- Failure to spread flush before adhesive sealant surface dries, which begins immediately, may result in a degraded repair.
 - (1) Completely fill affected area(s) with sealant and spread flush before sealant surface dries with adjacent rubber surfaces using spreading tool; ensure that no voids or air pockets remain in finished application. (See Figure 1.)

NOTE

It may be difficult to fill large areas. In this case a two step application of sealant may be necessary, using steps (2) and (3).

- (2) If two step application is utilized, partially fill affected area(s) with sealant, then cure until tack free.

- (3) Completely fill affected area(s) with sealant and spread flush with adjacent rubber surfaces using spreading tool; ensure that no voids or air pockets remain in finished application. (See figure 1.)
- d. Clean uncured residual sealant overflow from surrounding areas using isopropyl alcohol.
- e. Cure sealant at room temperature for 24 hours minimum (based on 77°F(25°C) and 50 percent relative humidity) or until Shore A hardness of 30 is obtained.

3. FIRST, SECOND, AND THIRD STAGE FAN AIR SEAL-BLEND REPAIR.

- a. Blend nicks and scratches with sharp indications or chafing and wear using crocus cloth, stones, and files. Length to depth ratio shall be minimum of 15 to 1.
- b. Remove minimum amount of material. Blend area shall be as smooth or smoother than adjacent surfaces.
- c. Fluorescent penetrant inspect blended area. Refer to T.O. 2-1-111, SPOP 82. No cracks allowed.



4. FIRST STAGE FAN AIR SEAL - SILICONE RUBBER REPLACEMENT.

(See Figures 2 through 8.)

- a. Remove air seal rubber using one of the following methods:

- (1) Remove air seal rubber with razor blades, clean plastic chisel type tool, or rotary wire brush. Do not generate heat during rubber removal. Refer to T.O. 2J-F100-53-1, WP 100 00.

NOTE

Water jet stripping of PWA 407 rubber is a source qualified procedure. Refer to T.O. 2J-F100-53-1, WP 602 00 for approved procedure number and for qualified sources.

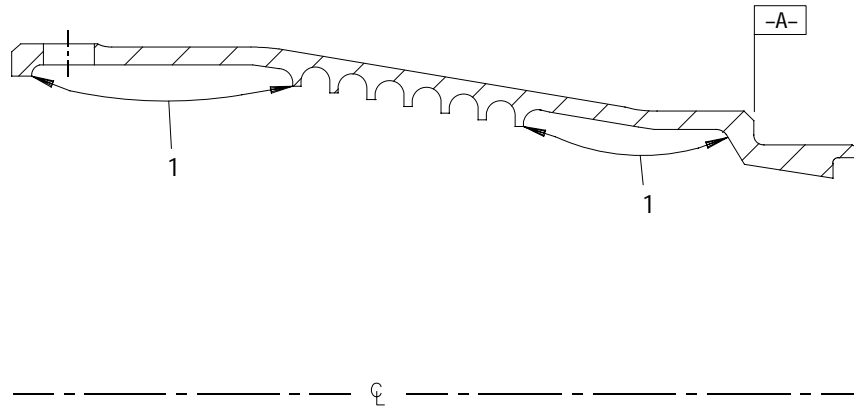
- (2) Remove air seal rubber by water jet stripping, as follows:

- (a) Install and secure air seal on PWA 71281 fixture.
- (b) Install in PWA 71296 water jet adapter.

- (c) Water jet strip rubber from air seal per approved process. Chloride content in water shall be 25 PPM maximum for titanium alloys.

- (d) Remove air seal from tooling.

- b. Clean air seal, using squirt or pour type dispensers with isopropyl alcohol. Do not use isopropyl alcohol with cheesecloth to wipe surfaces where silicone rubber will be applied.
- c. Visually inspect air seal to verify complete removal of PWA 407 rubber. See figure 2.
- d. Handle parts only with clean nylon gloves and avoid contact with areas to be bonded. Refer to T.O. 2J-F100-53-1, WP 100 00.
- e. When parts are not in clean room, wrap in neutral kraft paper to prevent contamination of bonding surfaces. Leave air seal uncovered a maximum of one hour.



79928 (24X2)

1. Silicone rubber stripping area.

Figure 2. First Stage Fan Air Seal - Silicone Rubber Removal

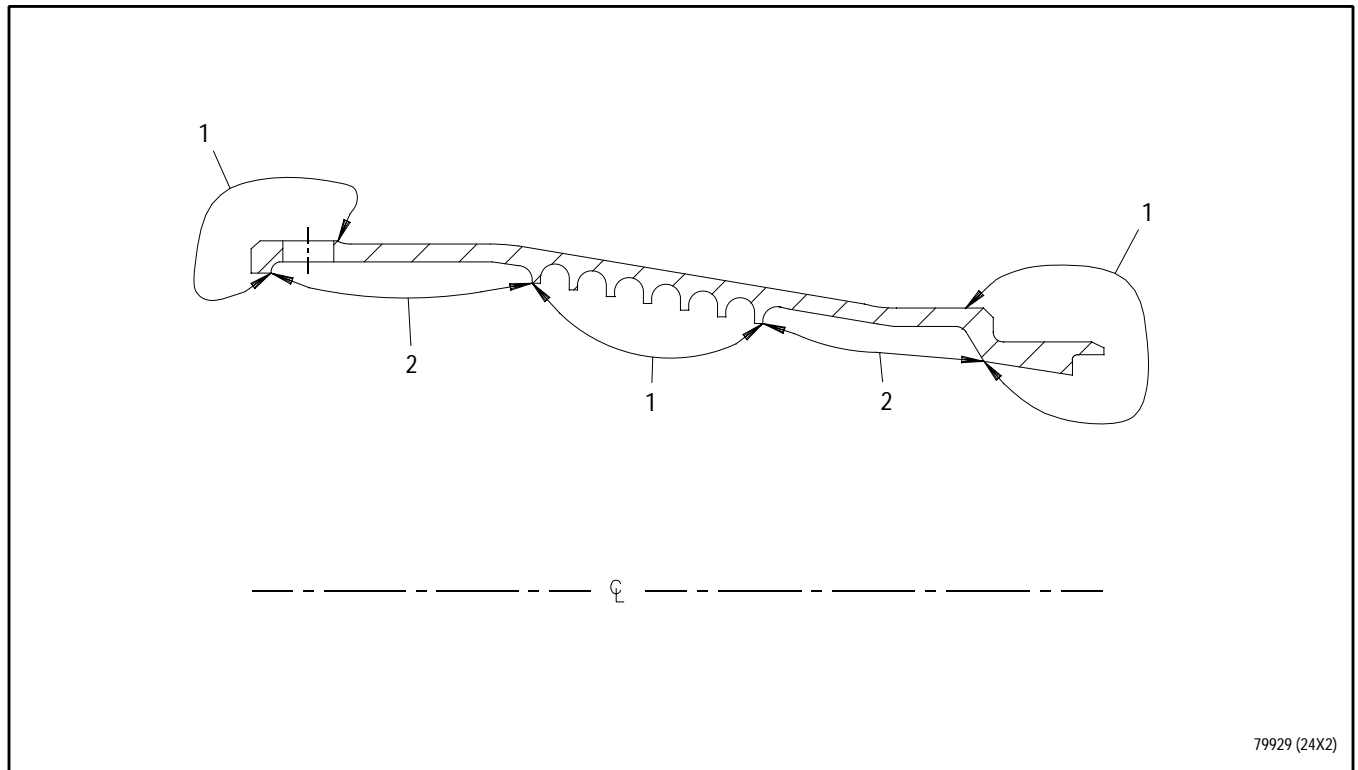
f. Using lead foil or polyester tape, mask aft and front ID area of air seal. See figure 3.

g. Grit blast forward and aft location bond areas using 90 grit. See figure 3. Refer to T.O. 2J-F100-53-1, WP 100 00 and following steps:

- (1) Grit blast two places on ID of air seal, using 50 to 70 psi.
- (2) Regulate pressure to avoid distortion. Grit blasted surfaces shall have a uniform matte finish. Regulate only within allocated pressure.
- (3) Wear clean nylon gloves when handling part after blasting.



- Failure to remove masking tape will cause alcohol to attack residual masking tape and cause blast residue to stick.
- Touching surfaces to be bonded causes contamination and interferes with bonding.
- (4) Remove masking tape before wiping with alcohol. Remove residual abrasive with isopropyl alcohol and cheesecloth. Do not touch surfaces to be bonded.



- 1. Masking areas.
- 2. Grit blast areas.

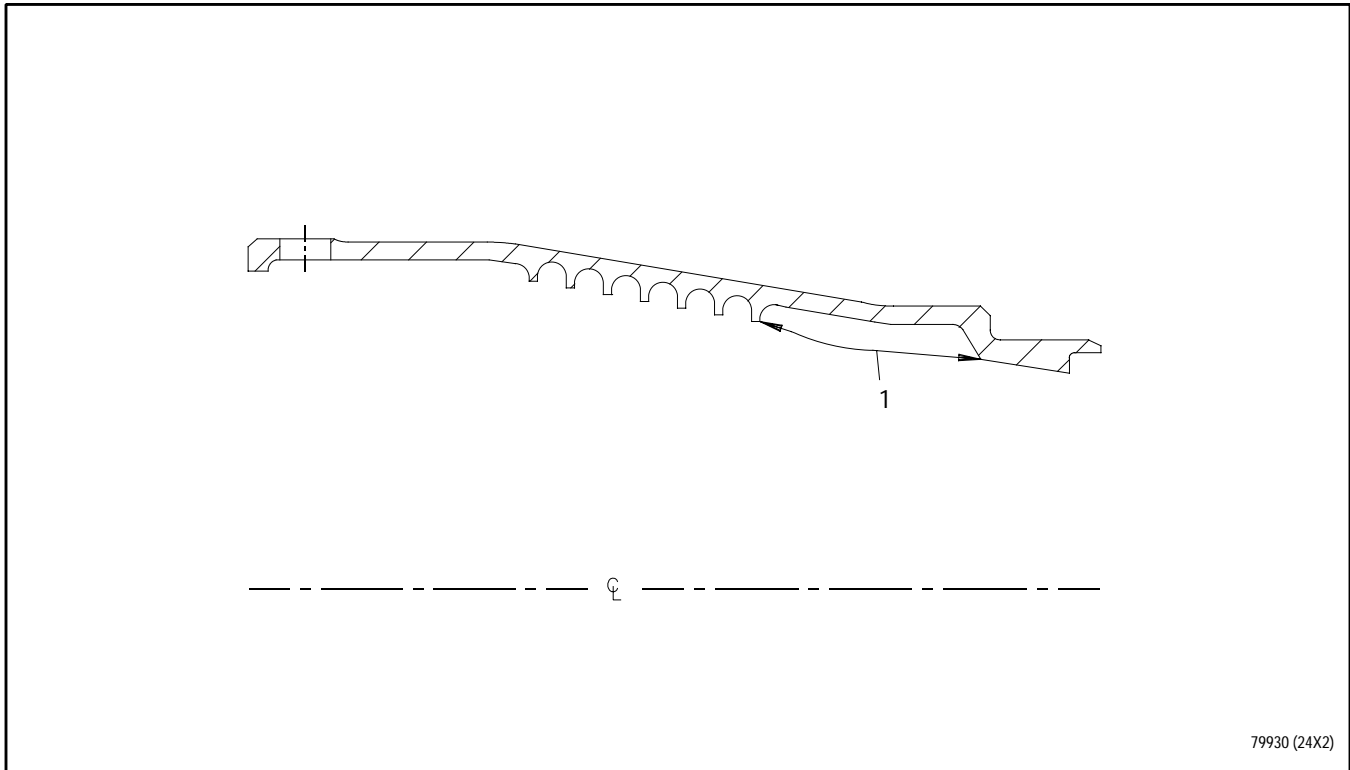
Figure 3. First Stage Fan Air Seal - Grit Blast

h. Apply primer to aft location area as follows:(See figure 4.)

- (1) Clean aft area by wiping with isopropyl alcohol. Air dry for 15 minutes.
- (2) Apply PWA 556 primer to aft location area, within 30 minutes after cleaning, to a nominal thickness of 0.0001 inch. Use clean cheesecloth or brush for each part to remove overspray. Do not contaminate bond area. Refer to T.O. 2J-F100-53-1, WP 100 00.
- (3) Cure primer at room temperature and 50% minimum relative humidity for two hours minimum and a maximum

of 24 hours prior to injection of silicone rubber.

- (4) Visually inspect primed area. Primed surface should have a faintly visible pink coloration. A white color indicates the film is too thick. If there is no visible coloration, film may not be continuous. If color is bright or streaky bright, film is too thick.
- (5) If application of rubber sealant cannot be accomplished by 24 hours maximum following primer application, part shall be grit blasted and reprimed.

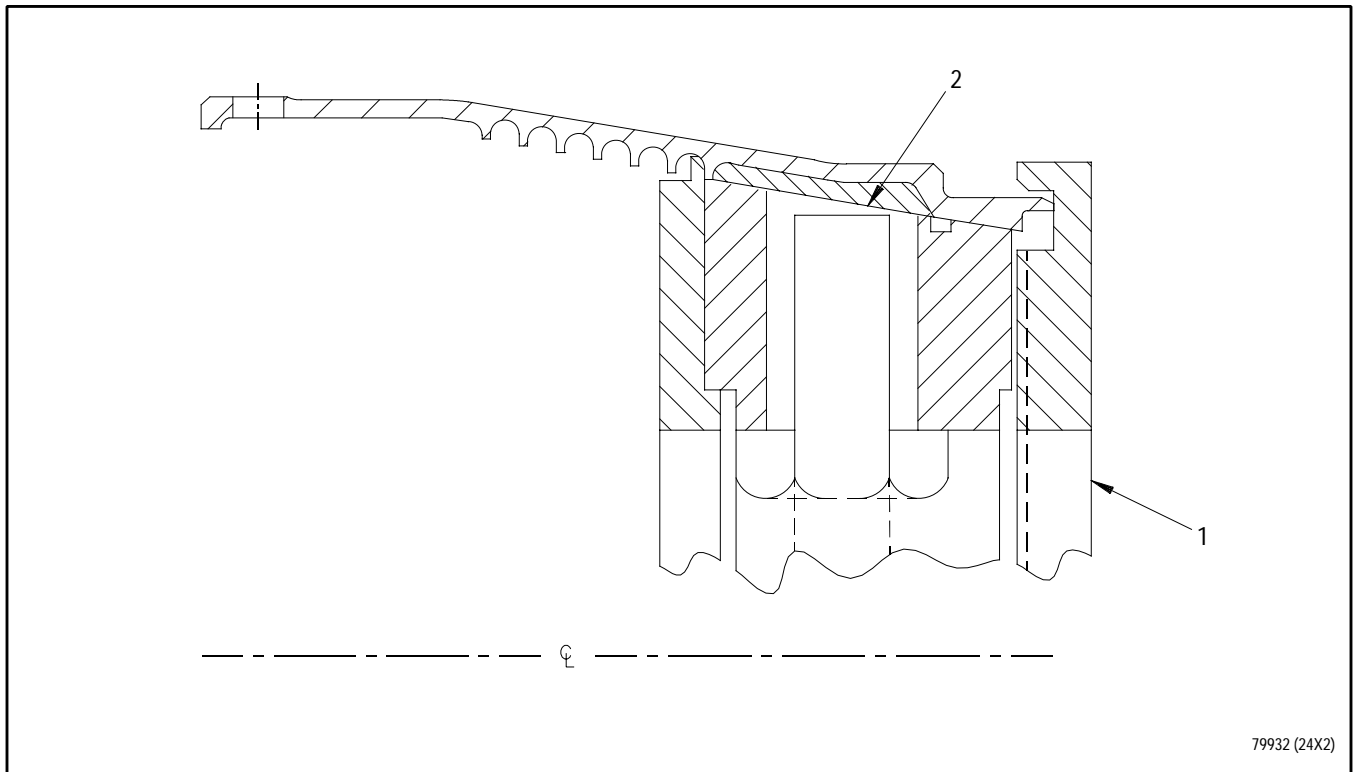


79930 (24X2)

1. Primer application area.

Figure 4. First Stage Fan Air Seal - Primer Application (Aft Location)

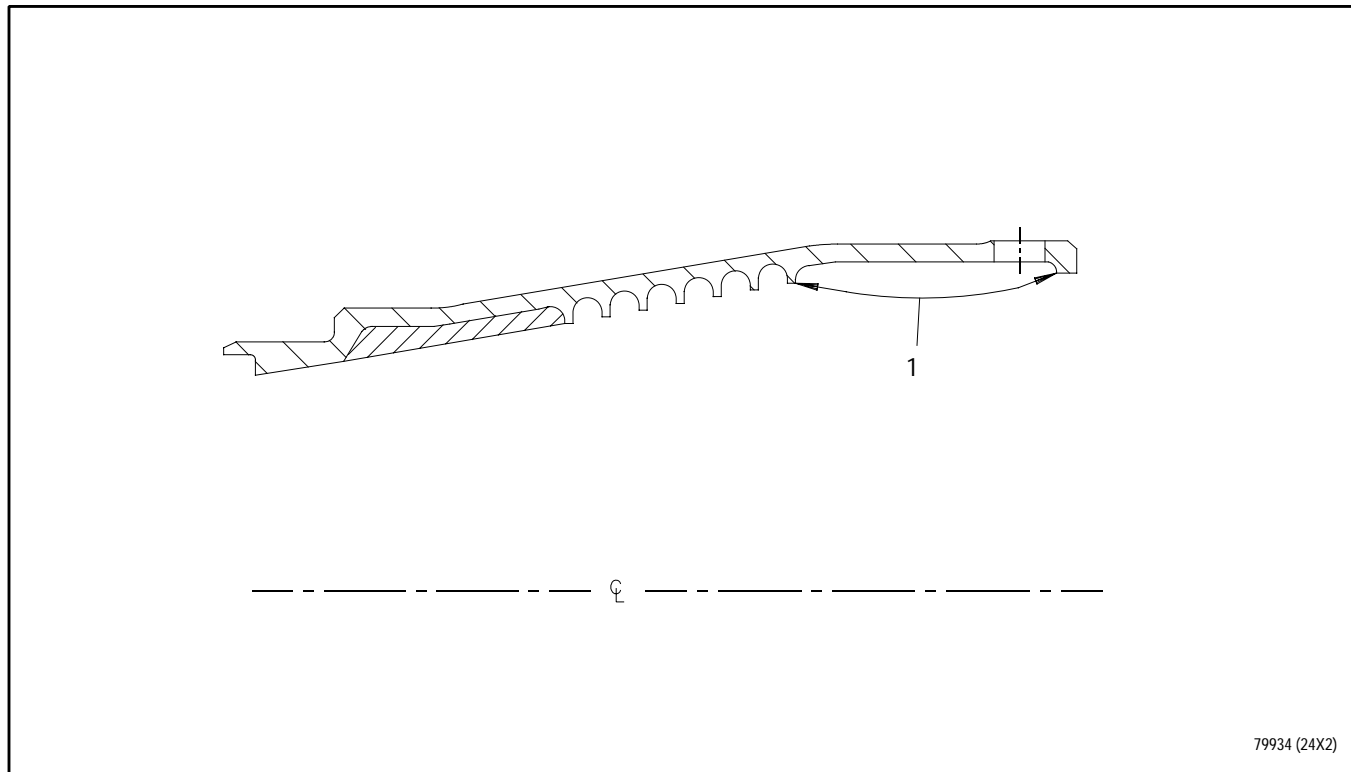
- i. Assemble air seal into PWA 70592 mold fixture for silicone rubber application on air seal aft location. (See figure 5.)
- j. Inject PWA 407 silicone rubber into mold. (See figure 5.) Refer to T.O. 2J-F100-53-1, WP 100 00.
- k. Cure rubber at 300°F(149°C) for one hour minimum after seal reaches this temperature in mold. Refer to T.O. 2J-F100-53-1, WP 100 00.
- l. Remove air seal from tool fixture. Remove rubber flashing and check rubber dimensions per figure 8.



- 1. PWA 70592 mold fixture
- 2. Rubber injection area.

Figure 5. First Stage Fan Air Seal - Silicone Rubber Application (Aft Location)

- m. Clean forward bond area that has been previously grit blasted by wiping with isopropyl alcohol and air dry for 15 minutes minimum. (See figure 6.)
- n. Apply PWA 556 primer to forward location area using same procedures specified previously for aft location area. (See figure 6.)

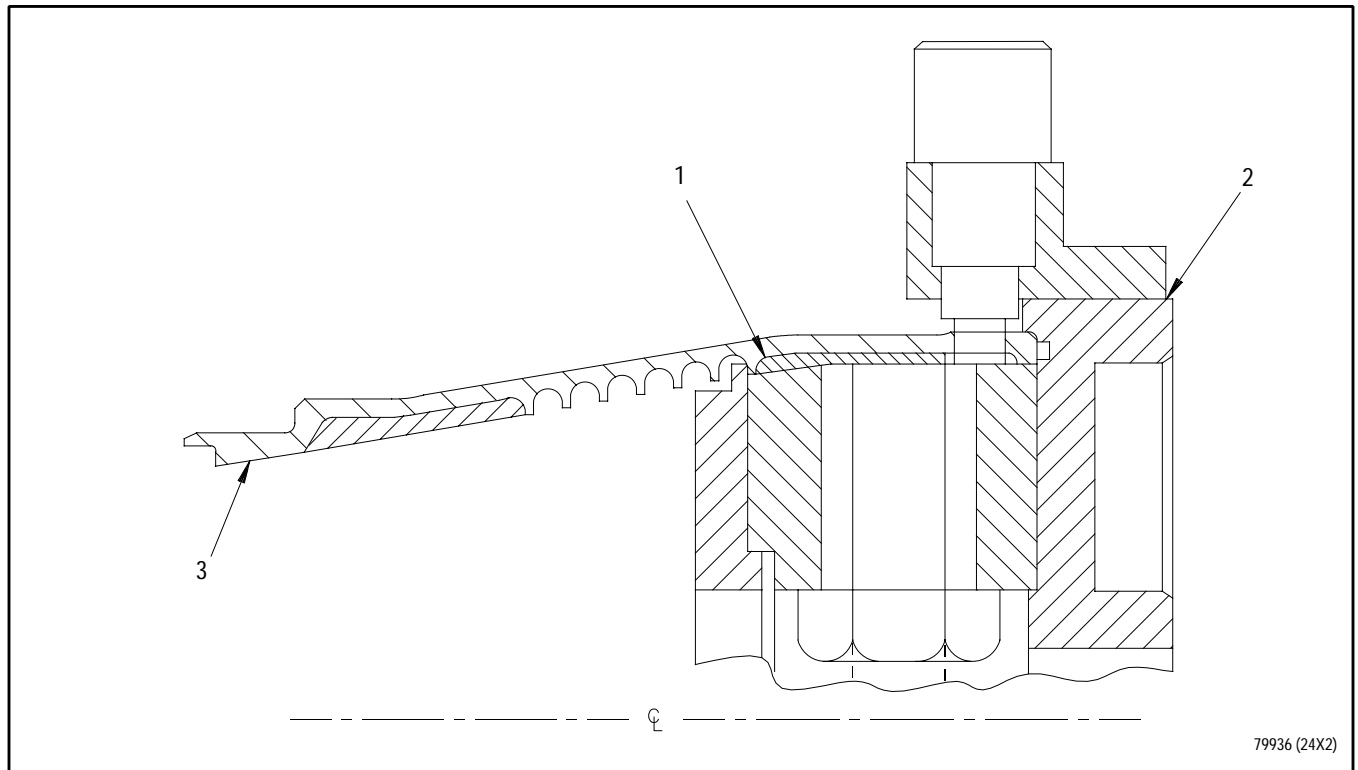


79934 (24X2)

1. Primer application area.

Figure 6. First Stage Fan Air Seal - Primer Application (Forward Location)

- o. Assemble air seal into PWA 70591 mold fixture for silicone rubber application on air seal front location. (See figure 7.)
 - p. Inject PWA 407 silicone rubber into mold. (See figure 7.) Refer to T.O. 2J-F100-53-1, WP 100 00.
 - q. Cure rubber at 300°F(149°C) for one hour minimum after seal reaches this temperature in mold. Refer to T.O. 2J-F100-53-1, WP 100 00.
 - r. Remove air seal from tooling.
 - s. Inspect preliminary cured silicone rubber per figure 8,
- Sheets 1 and 2. Refer to T.O. 2J-F100-53-1, WP 100 00.
- (1) Visually inspect for voids and minor defects to be repaired.
 - (2) Visually inspect for discoloration. No gray rubber allowed.
 - (3) Repair minor defects in rubber, if required. Refer to T.O. 2J-F100-53-1, WP 100 00.



79936 (24X2)

1. Silicone rubber application area.
2. PWA 70591 mold fixture.
3. First stage fan air seal.

Figure 7. First Stage Fan Air Seal - Silicone Rubber Application (Forward Location)

- t. Place airseal into oven without mold fixture. Cure at 390° to 410°F(198° to 210°C) for one hour to cure both front and aft rubber application areas.
- u. After completion of full cure, inspect for discoloration. No gray rubber is allowed. Refer to T.O. 2J-F100-53-1, WP 100 00.
- v. Perform hardness check. Refer to ASTM D2240. Hardness shall be within 52 to 65 durometer A. Hardness of locally repaired area shall be 40 to 65 durometer A.
- w. Check integrity of rubber to metal bond. Refer to T.O. 2J-F100-53-1, WP 101 00.
 - (1) Parts which show no signs of bulging or air leakage are acceptable.
 - (2) Parts which show any signs of bulging or air leakage shall be reprocessed. Refer to T.O. 2J-F100-53-1, WP 100 00.
- x. Finish machine silicone rubber per figure 8, Sheets 1 and 2.

NOTE

- UNLESS OTHERWISE SPECIFIED ALL DIAMETERS

$\oplus \varnothing .010 (S) A B (S) \text{ REF.}$

- UNLESS OTHERWISE SPECIFIED ALL DIAMETERS

APPLY WHEN SURFACE J IS $\square .001$

AND E MAINTAINS A CLEARANCE ENVELOPE

$\varnothing 34.721$ FOR PN 4061566, $\varnothing 34.715$

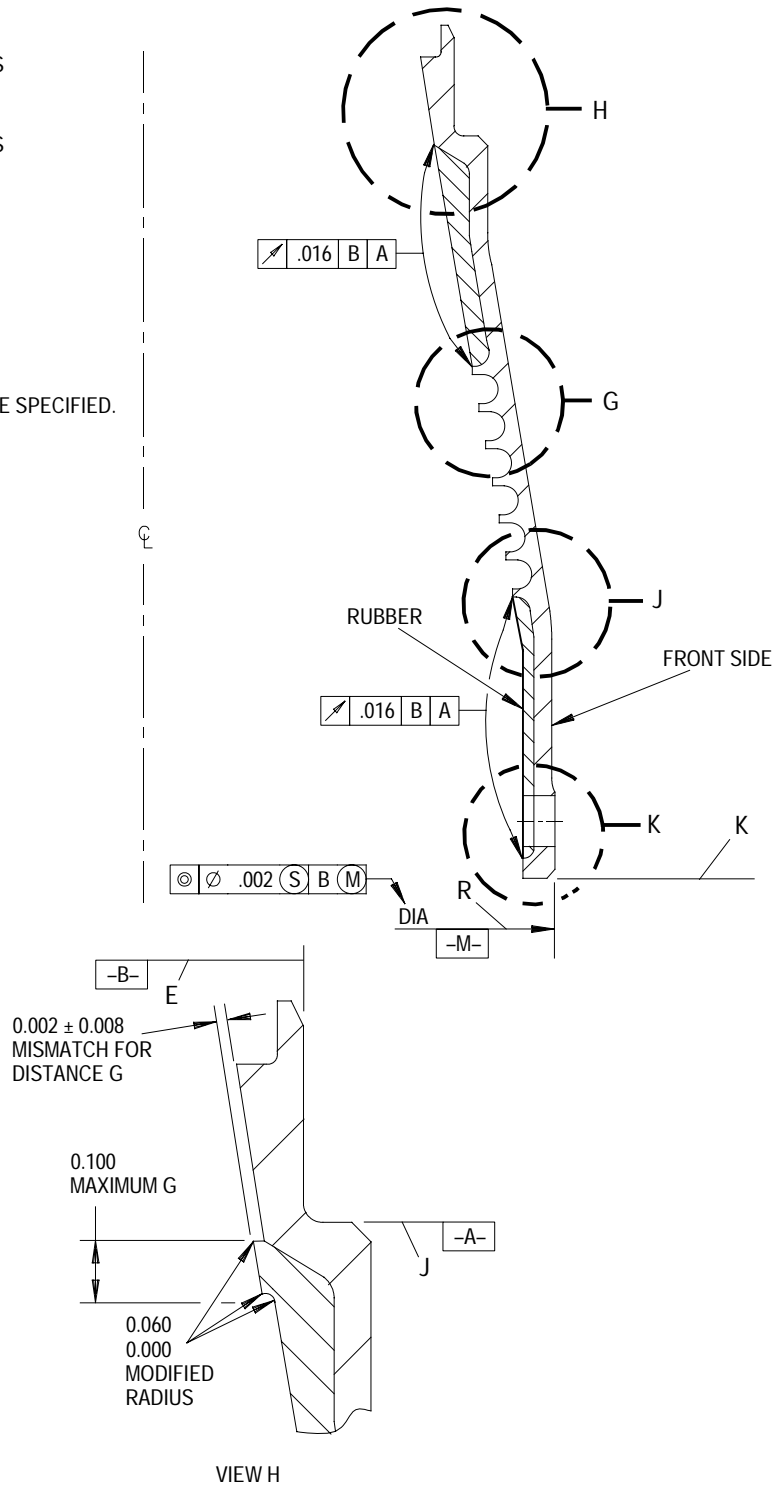
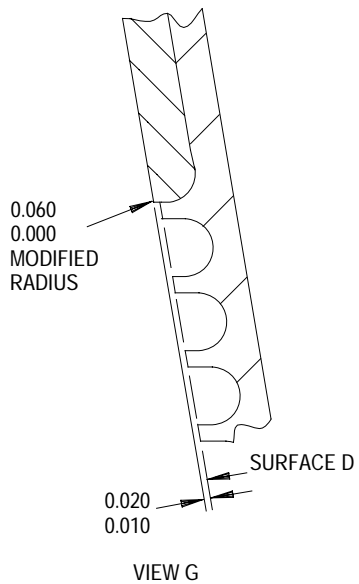
FOR PN 4075235 IN FREE STATE

OR CONSTRAINED.

- CONSTRAINT CONTACT ALLOWED ONLY ON SURFACES J AND K.

$\varnothing E$ AND $\varnothing R$.

- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED.



79937 (48X2)

Figure 8. First Stage Fan Air Seal - Silicone Rubber Finish Machining (Sheet 1 of 2)

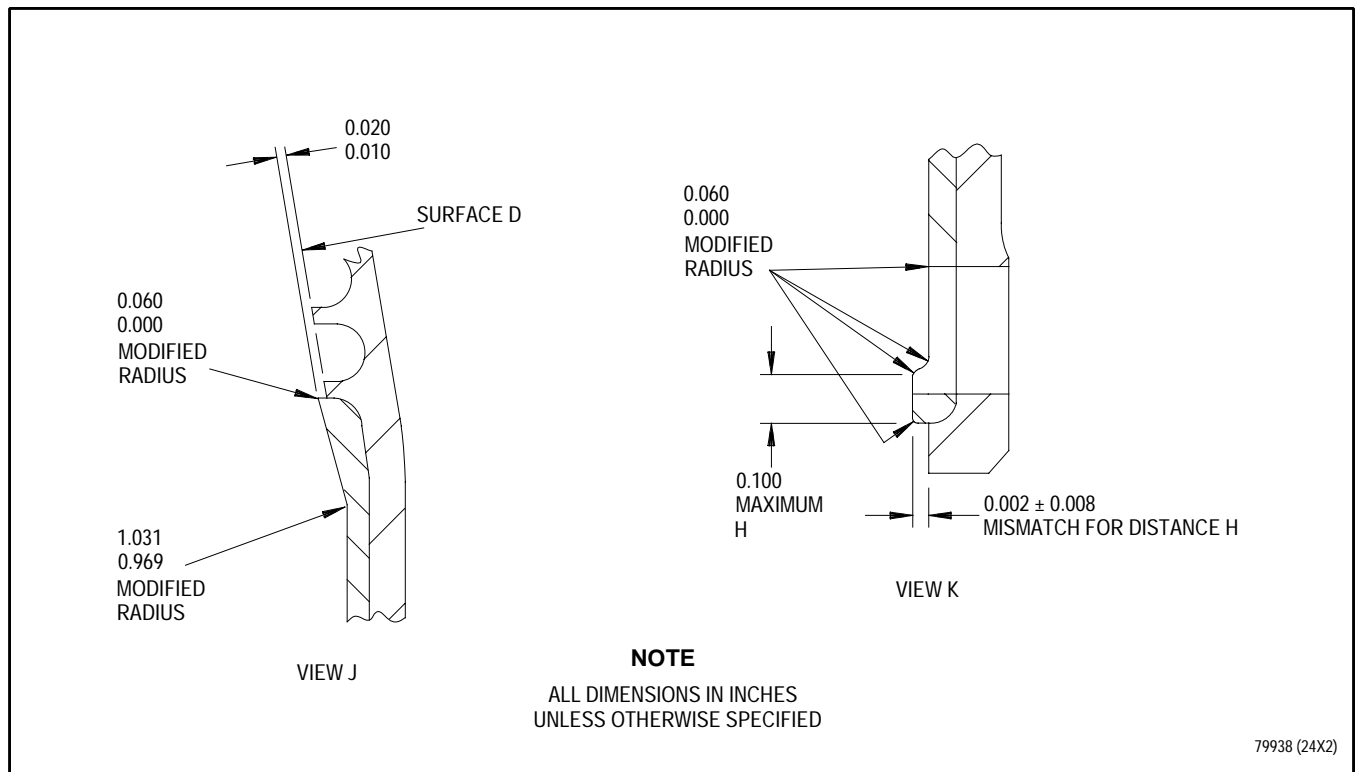


Figure 8. First Stage Fan Air Seal - Silicone Rubber Finish Machining (Sheet 2 of 2)

5. SECOND STAGE FAN AIR SEAL-SILICONE RUBBER REPLACEMENT.

(See figures 9 through 16.)

- a. Remove air seal rubber using one of the following methods:

(1) Remove air seal rubber with razor blades, clean plastic chisel type tool, or rotary wire brush. Do not generate heat during rubber removal. Refer to T.O. 2J-F100-53-1, WP 100 00.

NOTE

Water jet stripping of PWA 407 rubber is a source qualified procedure. Refer to T.O. 2J-F100-53-1, WP 602 00 for approved procedure number and for qualified sources.

- (2) Remove air seal rubber by water jet stripping, as follows:

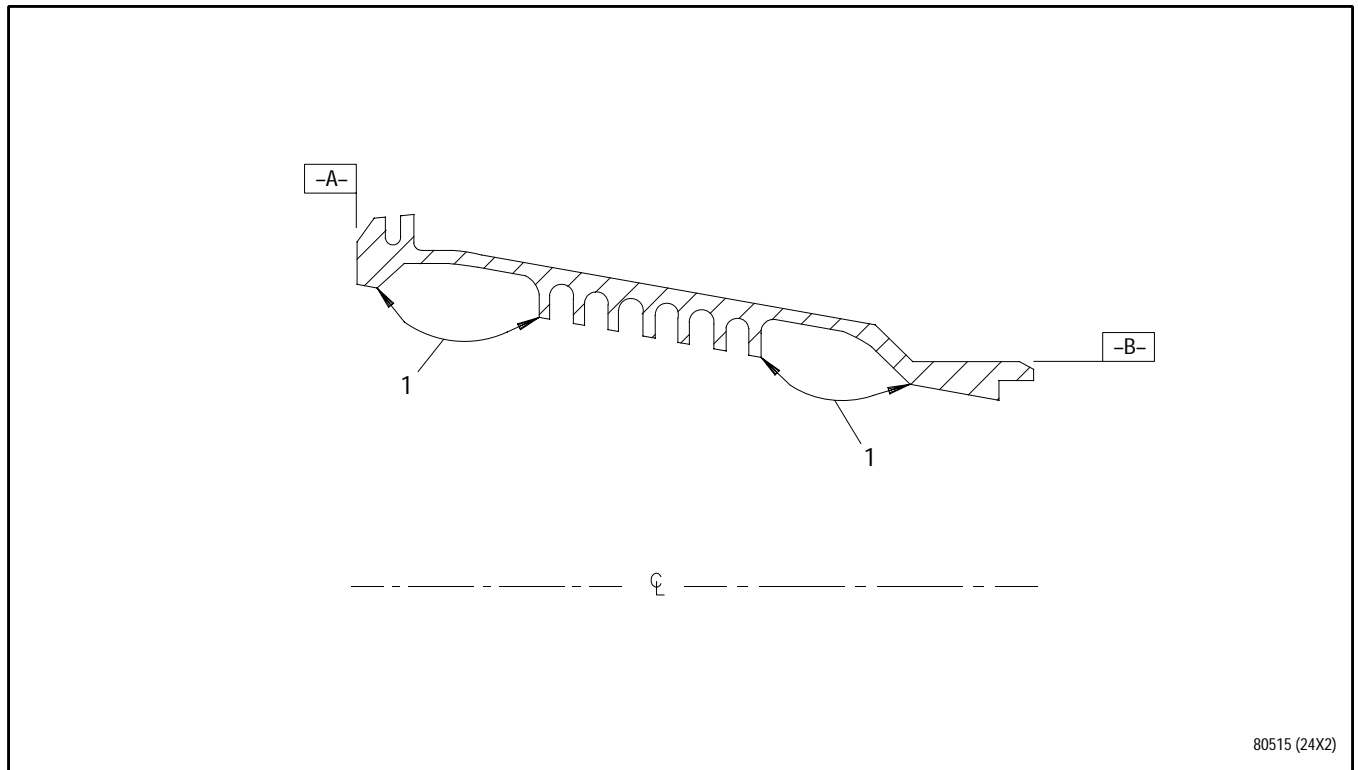
(a) Install and secure air seal on PWA 71282 fixture.

(b) Install in PWA 71296 water jet adapter.

(c) Water jet strip rubber from air seal per approved process. Chloride content in water shall be 25 PPM maximum for titanium alloys.

(d) Remove air seal from tooling.

- b. Clean air seal, using squirt or pour type dispensers with isopropyl alcohol. Do not use isopropyl alcohol with cheesecloth to wipe surfaces where silicone rubber will be applied.
- c. Visually inspect air seal to verify complete removal of PWA 407 rubber. See figure 9.
- d. Handle parts only with clean nylon gloves and avoid contact with areas to be bonded. Refer to T.O. 2J-F100-53-1, WP 100 00.
- e. When parts are not in clean room, wrap in neutral kraft paper to prevent contamination of bonding surfaces. Leave air seal uncovered a maximum of one hour.



1. Silicone rubber stripping area.

Figure 9. Second Stage Fan Air Seal-Silicone Rubber Removal

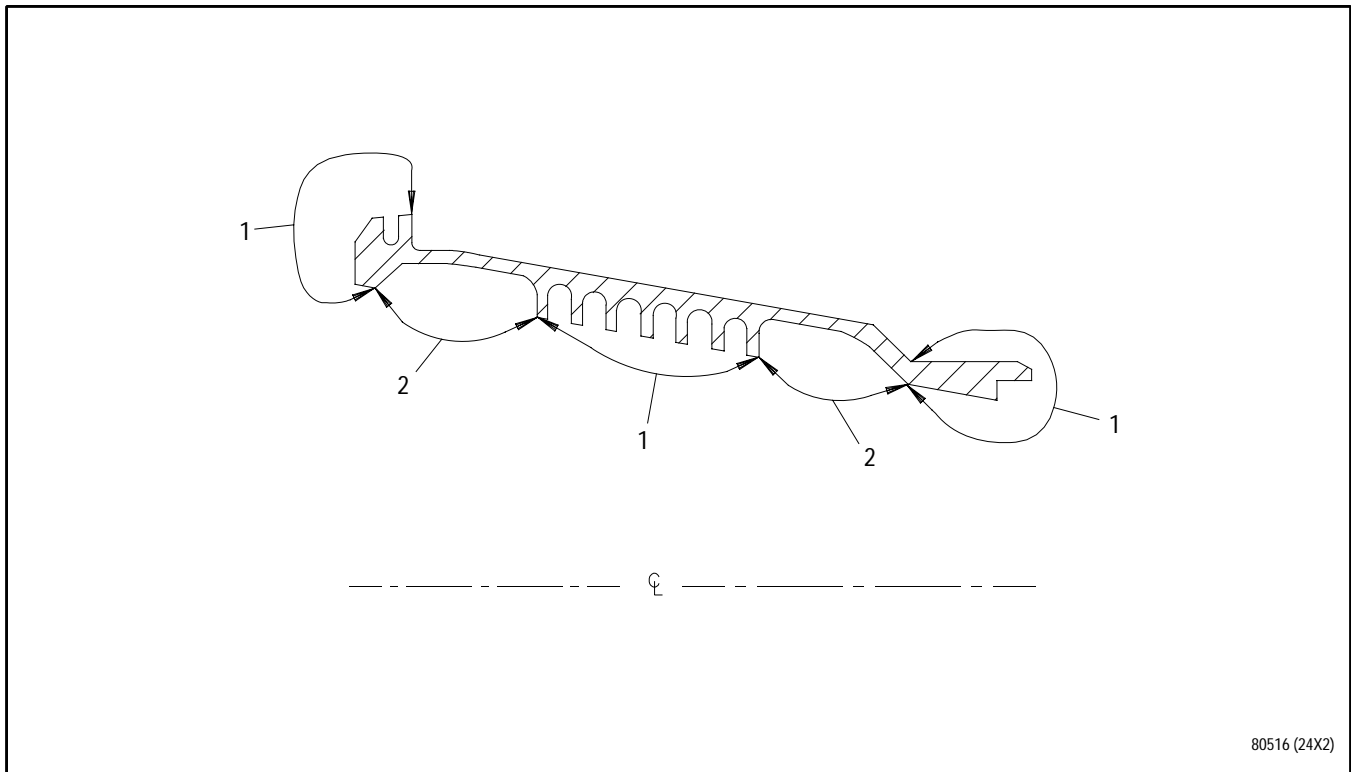
f. Using lead foil or polyester tape, mask aft and front ID area of air seal. See figure 10.

g. Grit blast forward and aft location bond areas using 90 grit. See figure 10. Refer to T.O. 2J-F100-53-1, WP 100 00 and following steps:

- (1) Grit blast two places on ID of air seal, using 50 to 70 psi.
- (2) Regulate pressure to avoid distortion. Grit blasted surfaces shall have a uniform matte finish. Regulate only within allocated pressure.
- (3) Wear clean nylon gloves when handling part after blasting.



- Failure to remove masking tape will cause alcohol to attack residual masking tape and cause blast residue to stick.
- Touching bonding surfaces causes contamination and interferes with bonding.
- (4) Remove masking tape before applying alcohol. Remove residual abrasive with isopropyl alcohol and cheesecloth. Do not touch surfaces to be bonded.



- 1. Masking areas.
- 2. Grit blast areas.

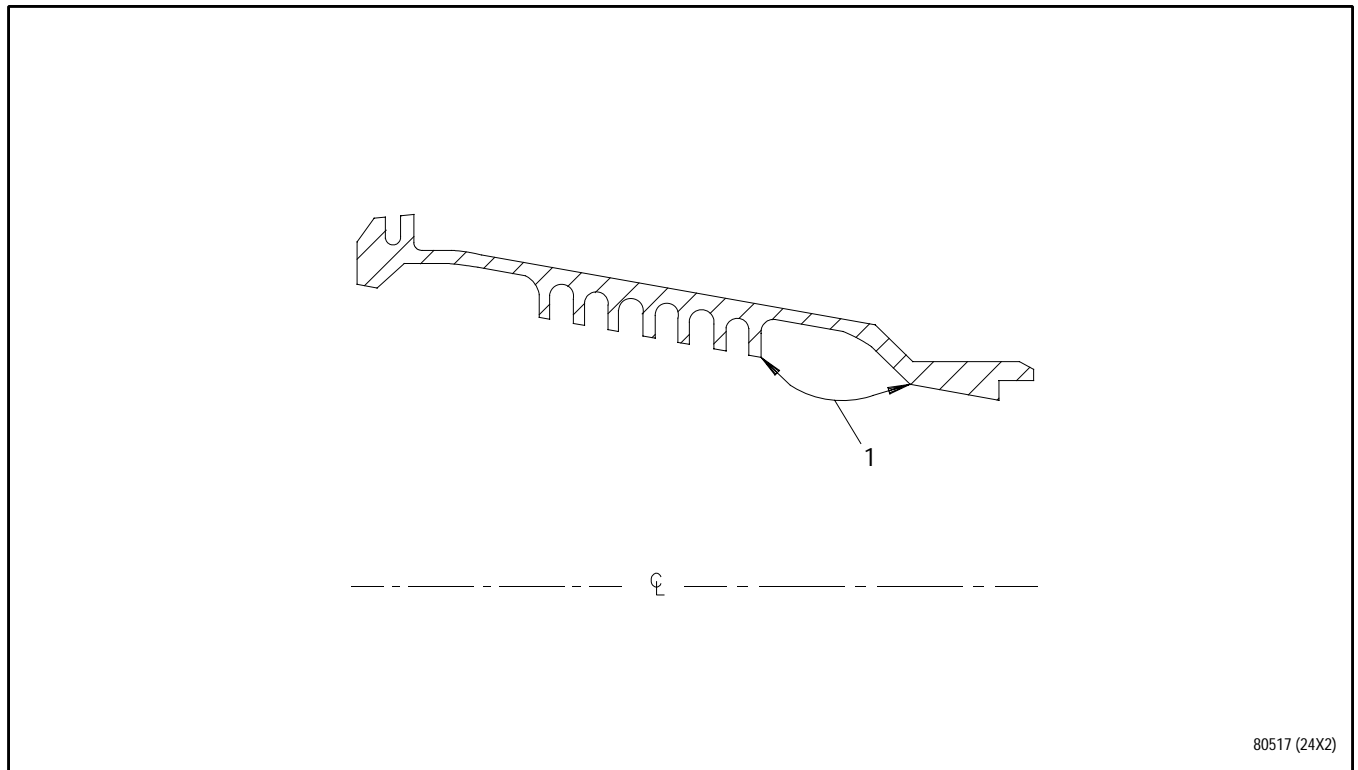
Figure 10. Second Stage Fan Air Seal-Grit Blast

h. Apply primer to aft location area as follows:(See figure 11.)

- (1) Clean aft area by wiping with isopropyl alcohol. Air dry for 15 minutes.
- (2) Apply PWA 556 primer to aft location area, within 30 minutes after cleaning, to a nominal thickness of 0.0001 inch. Use clean cheesecloth or brush for each part to remove overspray. Do not contaminate bond area. Refer to T.O. 2J-F100-53-1, WP 100 00.
- (3) Cure primer at room temperature and 50% minimum relative humidity for two hours minimum and a maximum

of 24 hours prior to injection of silicone rubber.

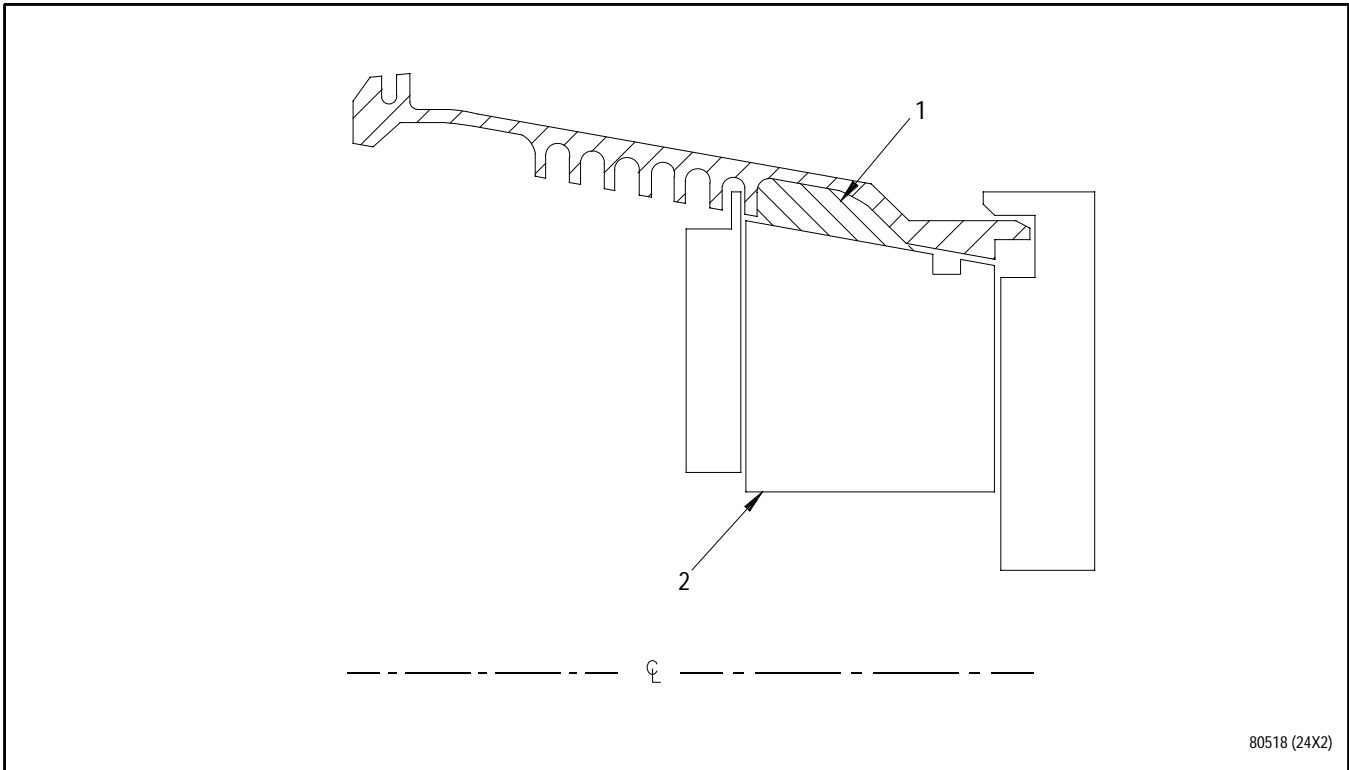
- (4) Visually inspect primed area. Primed surface should have a faintly visible pink coloration. A white color indicates the film is too thick. If there is no visible coloration, film may not be continuous. If color is bright or streaky bright, film is too thick.
- (5) If application of rubber sealant cannot be accomplished by 24 hours maximum following primer application, part shall be grit blasted and reprimed.



1. Primer application area.

Figure 11. Second Stage Fan Air Seal - Primer Application (Aft Location)

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>i. Assemble air seal into PWA 70594 mold fixture for silicone rubber application on air seal aft location. (See figure 12.)</p> <p>j. Inject PWA 407 silicone rubber into mold. (See figure 12.) Refer to T.O. 2J-F100-53-1, WP 100 00.</p> | <p>k. Cure rubber at 300°F(149°C) for one hour minimum after seal reaches this temperature in mold. Refer to T.O. 2J-F100-53-1, WP 100 00.</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|



80518 (24X2)

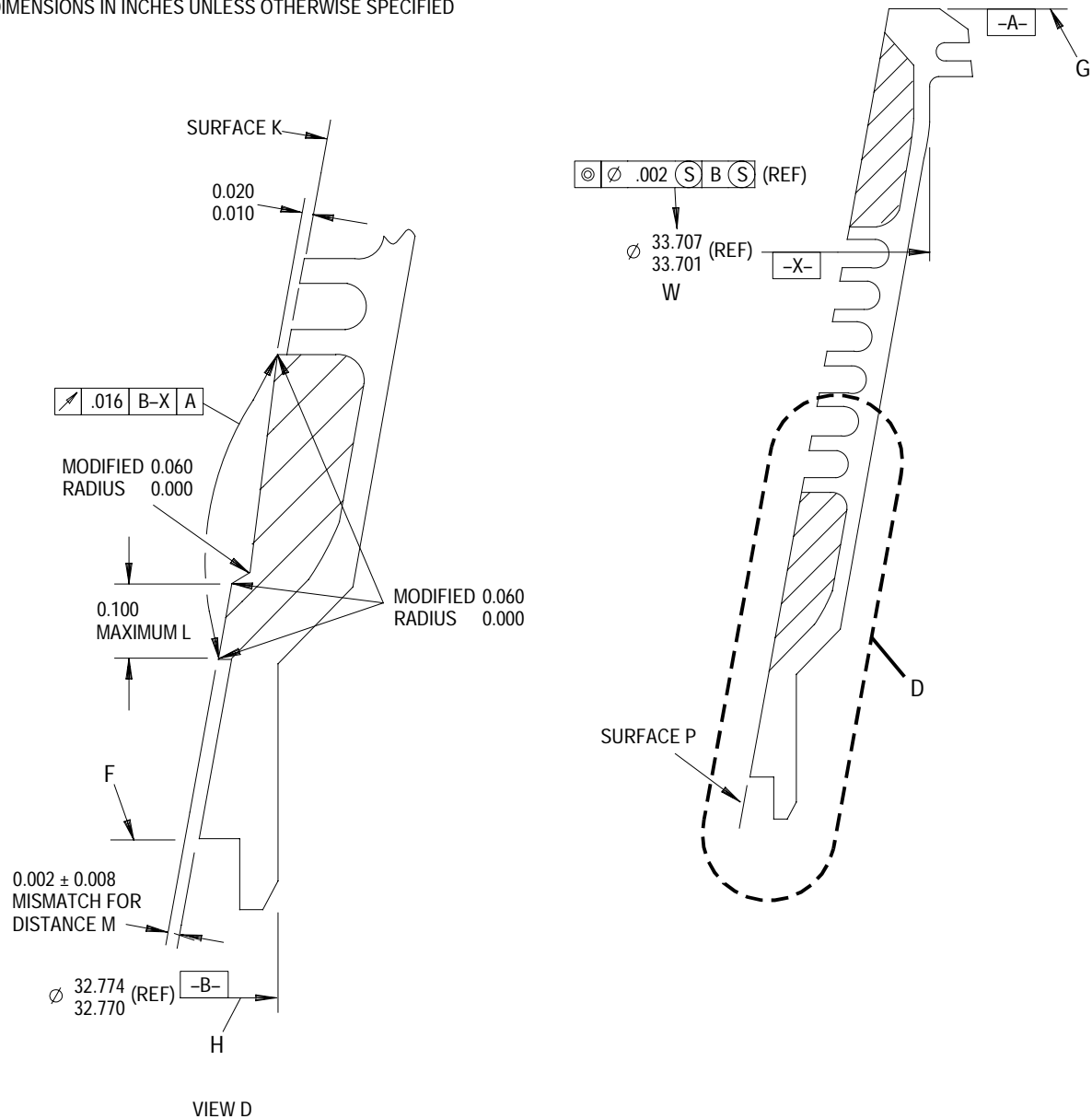
- 1. Rubber injection area.
- 2. PWA 70594 mold fixture

Figure 12. Second Stage Fan Air Seal-Silicone Rubber Application (Aft Location)

- l. Remove air seal from tool fixture. Remove rubber flashing and check rubber dimensions per figure 13.
- m. Clean forward bond area that has been previously grit blasted by wiping with isopropyl alcohol and air dry for 15 minutes minimum. (See figure 14.)
- n. Apply PWA 556 primer to forward location area using same procedures specified previously for aft location area. (See figure 14.)

NOTE

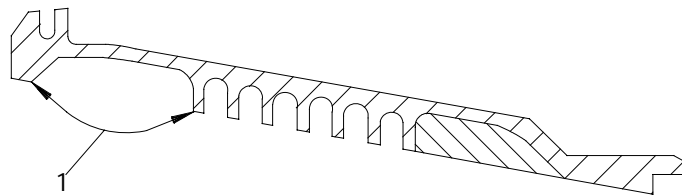
- UNLESS OTHERWISE SPECIFIED ALL DIAMETERS $\boxed{\oplus} \varnothing .010 \boxed{S} A \boxed{B} \boxed{S}$
- UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS APPLY WHEN SURFACE G IS $\boxed{\square} .001$ AND $\varnothing H$ MAINTAINS A CLEARANCE ENVELOPE OF $\varnothing 32.775$ IN FREE STATE OR CONSTRAINED. CONSTRAINT CONTACT ALLOWED ONLY ON SURFACES G AND F AND $\varnothing H$ AND $\varnothing W$.
- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED



80519 (48X2)

Figure 13. Second Stage Fan Air Seal-Silicone Rubber Finish Machining (Aft Location)

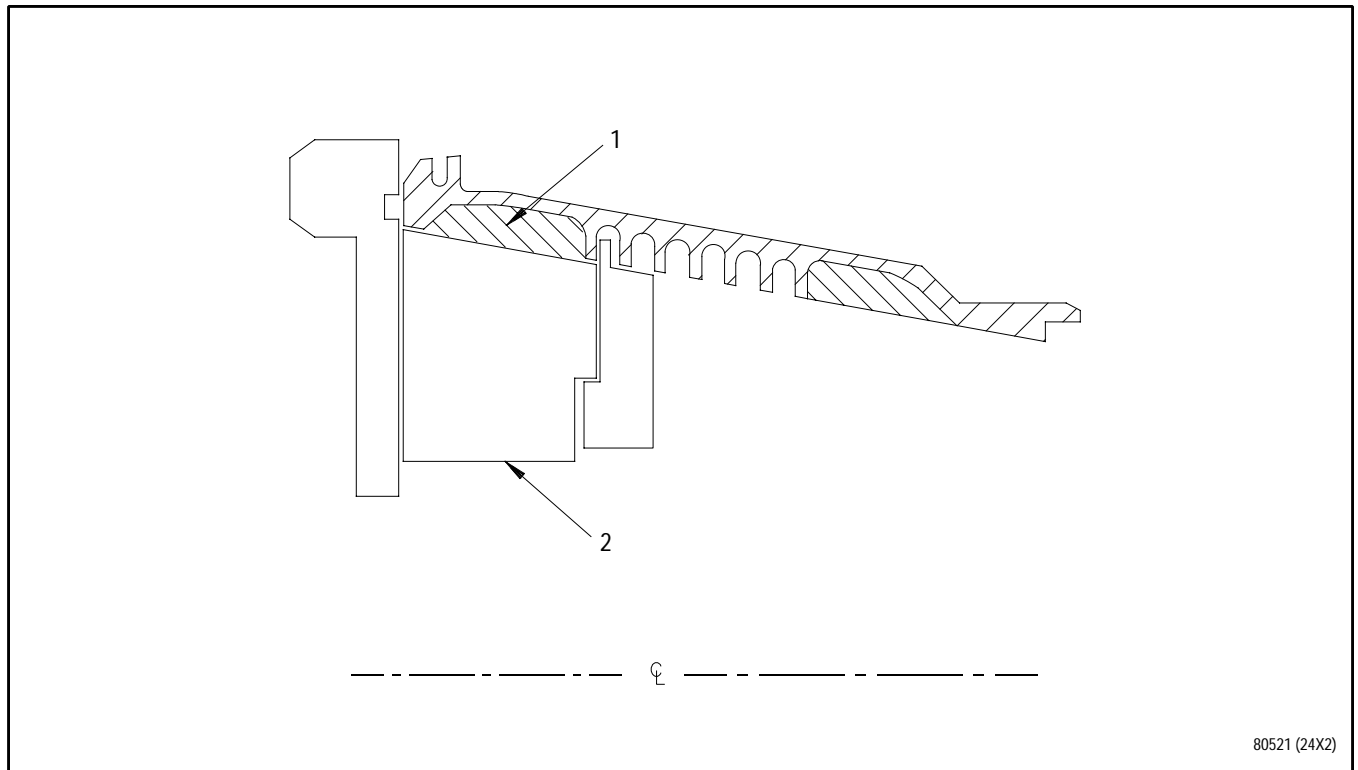
- o. Assemble air seal into PWA 70593 mold fixture for silicone rubber application on air seal front location. (See figure 15.)
- p. Inject PWA 407 silicone rubber into mold. (See figure 15.) Refer to T.O. 2J-F100-53-1, WP 100 00.
- q. Cure rubber at 300°F(149°C) for one hour minimum after seal reaches this temperature in mold. Refer to T.O. 2J-F100-53-1, WP 100 00.
- r. Remove air seal from tooling.
- s. Inspect preliminary cured silicone rubber per figure 16. Refer to T.O. 2J-F100-53-1, WP 100 00.
 - (1) Visually inspect for voids and minor defects to be repaired.
 - (2) Visually inspect for discoloration. No gray rubber allowed.
 - (3) Repair minor defects in rubber, if required. Refer to T.O. 2J-F100-53-1, WP 100 00.



80520 (24X2)

- 1. Primer application area.

Figure 14. Second Stage Fan Air Seal-Primer Application (Forward Location)



80521 (24X2)

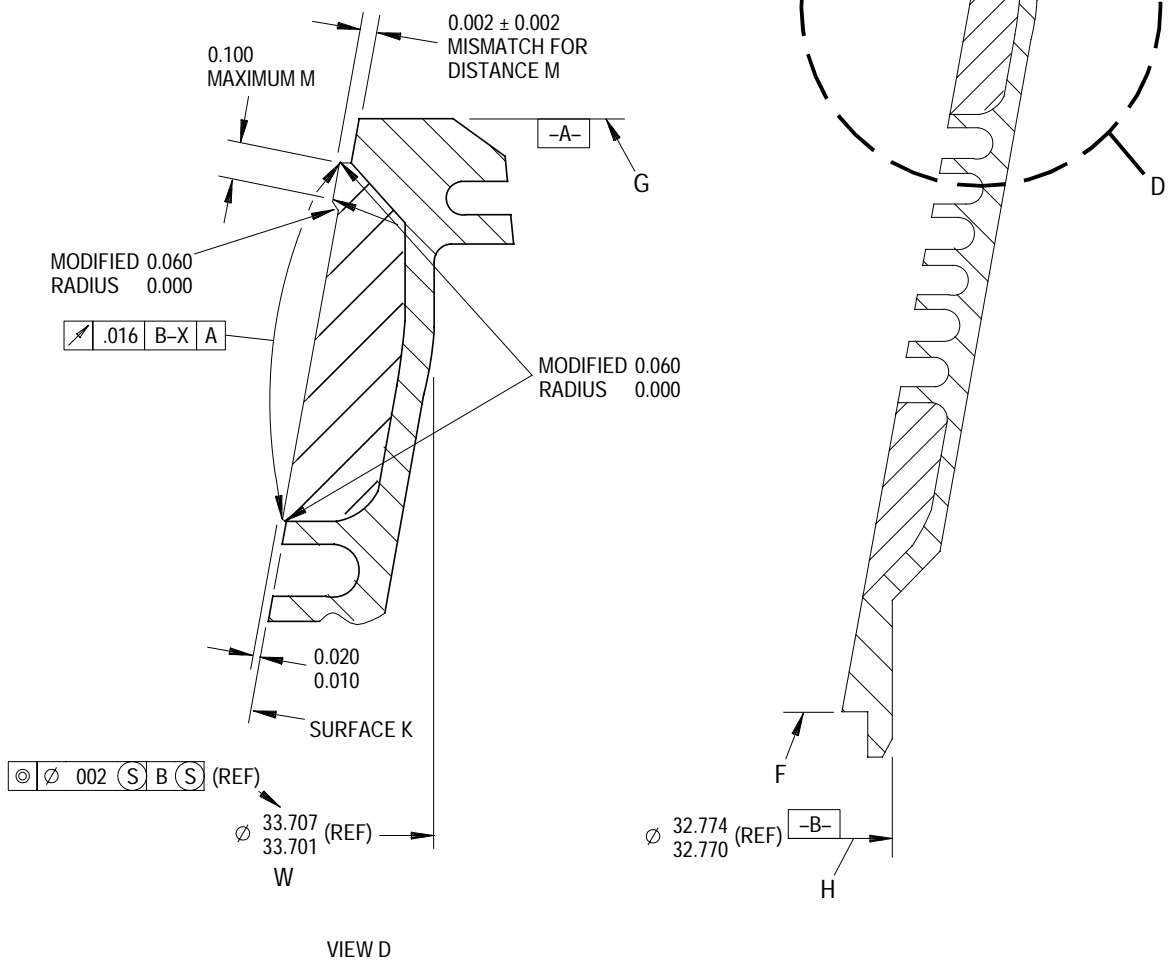
1. Silicone rubber application area.
2. PWA 70593 mold fixture.

Figure 15. Second Stage Fan Air Seal-Silicone Rubber Application (Forward Location)

- t. Place airseal into oven without mold fixture. Cure at 390° to 410°F (198° to 210°C) for one hour to cure both front and aft rubber application areas.
- u. After completion of full cure, inspect for discoloration. No gray rubber is allowed. Refer to T.O. 2J-F100-53-1, WP 100 00.
- v. Perform hardness check. Refer to ASTM D2240. Hardness shall be within 52 to 65 durometer A. Hardness of locally repaired area shall be 40 to 65 durometer A.
- w. Check integrity of rubber to metal bond. Refer to T.O. 2J-F100-53-1, WP 101 00.
 - (1) Parts which show no signs of bulging or air leakage are acceptable.
 - (2) Parts which show any signs of bulging or air leakage shall be reprocessed. Refer to T.O. 2J-F100-53-1, WP 100 00.
- x. Finish machine silicone rubber per figures 13 and 16.

NOTE

- UNLESS OTHERWISE SPECIFIED ALL DIAMETERS $\boxed{\oplus \varnothing .010 (S) A B (S)}$
- UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS APPLY WHEN SURFACE G IS $\boxed{\square .001}$ AND $\varnothing H$ MAINTAINS A CLEARANCE ENVELOPE OF $\varnothing 32.775$ IN FREE STATE OR CONSTRAINED. CONSTRAINT CONTACT ALLOWED ONLY ON SURFACES G AND F AND $\varnothing H$ AND $\varnothing W$.
- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED



80522 (48X2)

Figure 16. Second Stage Fan Air Seal-Silicone Rubber Finish Machining (Forward Location)

6. THIRD STAGE FAN AIR SEAL-SILICONE RUBBER REPLACEMENT.

(See Figures 17 through 24.)

- a. Remove air seal rubber using one of the following methods:

- (1) Remove air seal rubber with razor blades, clean plastic chisel type tool, or rotary wire brush. Do not generate heat during rubber removal. Refer to T.O. 2J-F100-53-1, WP 100 00.

NOTE

Water jet stripping of PWA 407 rubber is a source qualified procedure. Refer to T.O. 2J-F100-53-1, WP 602 00 for approved procedure number and for qualified sources.

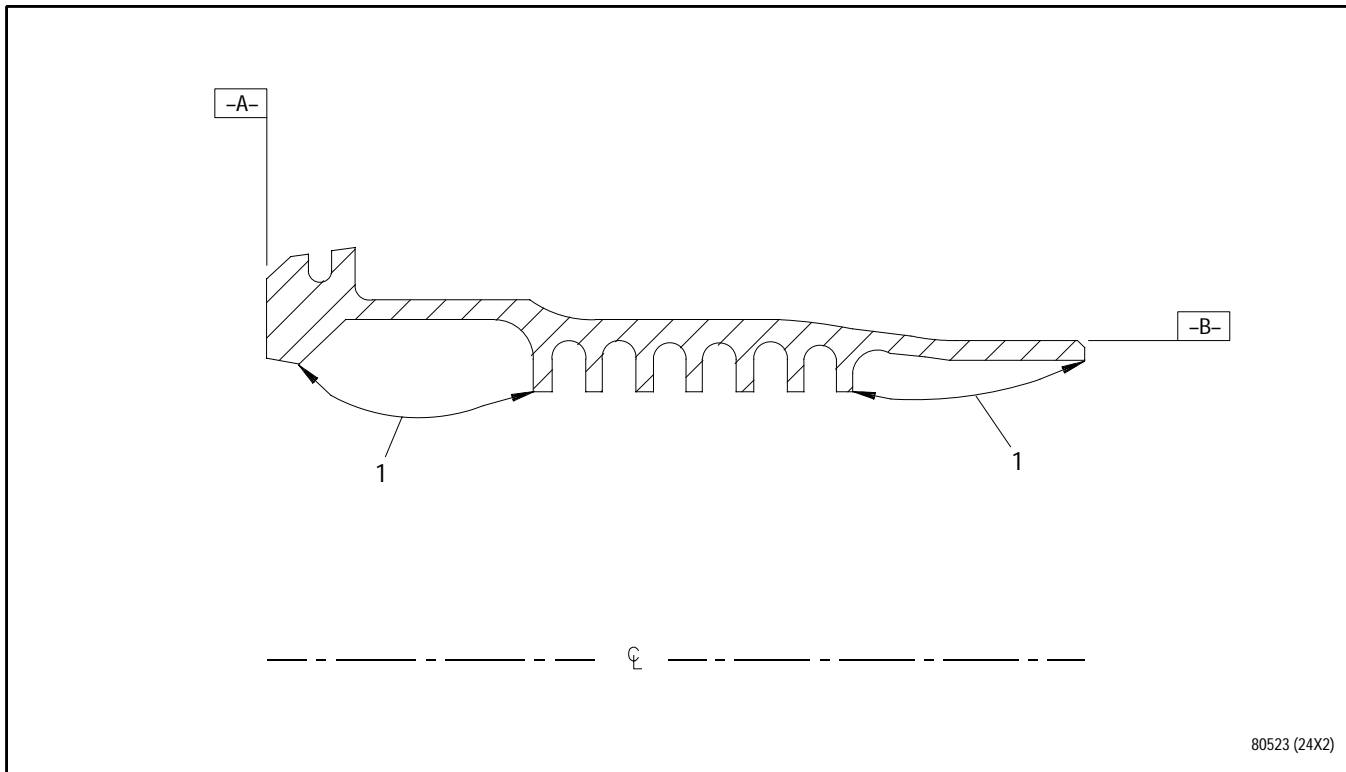
- (2) Remove air seal rubber by water jet stripping, as follows:

- (a) Install and secure air seal on PWA 71283 fixture.
- (b) Install in PWA 71296 water jet adapter.

- (c) Water jet strip rubber from air seal per approved process. Chloride content in water shall be 25 PPM maximum for titanium alloys.

- (d) Remove air seal from tooling.

- b. Clean air seal, using squirt or pour type dispensers with isopropyl alcohol. Do not use isopropyl alcohol with cheesecloth to wipe surfaces where silicone rubber will be applied.
- c. Visually inspect air seal to verify complete removal of PWA 407 rubber. See figure 17.
- d. Handle parts only with clean nylon gloves and avoid contact with areas to be bonded. Refer to T.O. 2J-F100-53-1, WP 100 00.
- e. When parts are not in clean room, wrap in neutral kraft paper to prevent contamination of bonding surfaces. Leave air seal uncovered a maximum of one hour.



80523 (24X2)

1. Silicone rubber stripping area.

Figure 17. Third Stage Fan Air Seal-Silicone Rubber Removal

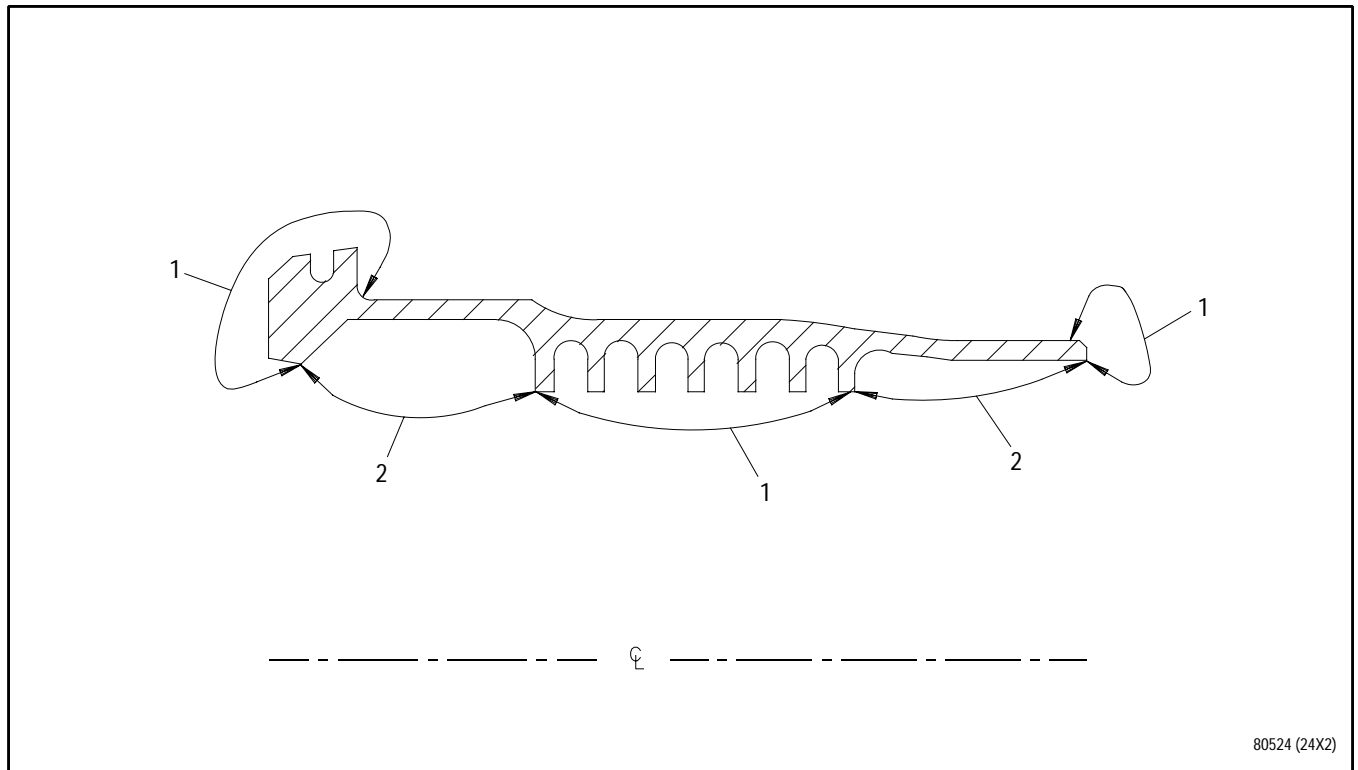
f. Using lead foil or polyester tape, mask aft and front ID area of air seal. See figure 18.

g. Grit blast forward and aft location bond areas using 90 grit. See figure 18. Refer to T.O. 2J-F100-53-1, WP 100 00 and following steps:

- (1) Grit blast two places on ID of air seal, using 50 to 70 psi.
- (2) Regulate pressure to avoid distortion. Grit blasted surfaces shall have a uniform matte finish. Regulate only within allocated pressure.
- (3) Wear clean nylon gloves when handling part after blasting.



- Failure to remove masking tape will cause alcohol to attack residual masking tape and cause blast residue to stick.
- Touching of bonding surfaces causes contamination and interferes with bonding.
- (4) Remove masking tape before applying alcohol. Remove residual abrasive with isopropyl alcohol and cheesecloth. Do not touch surfaces to be bonded.

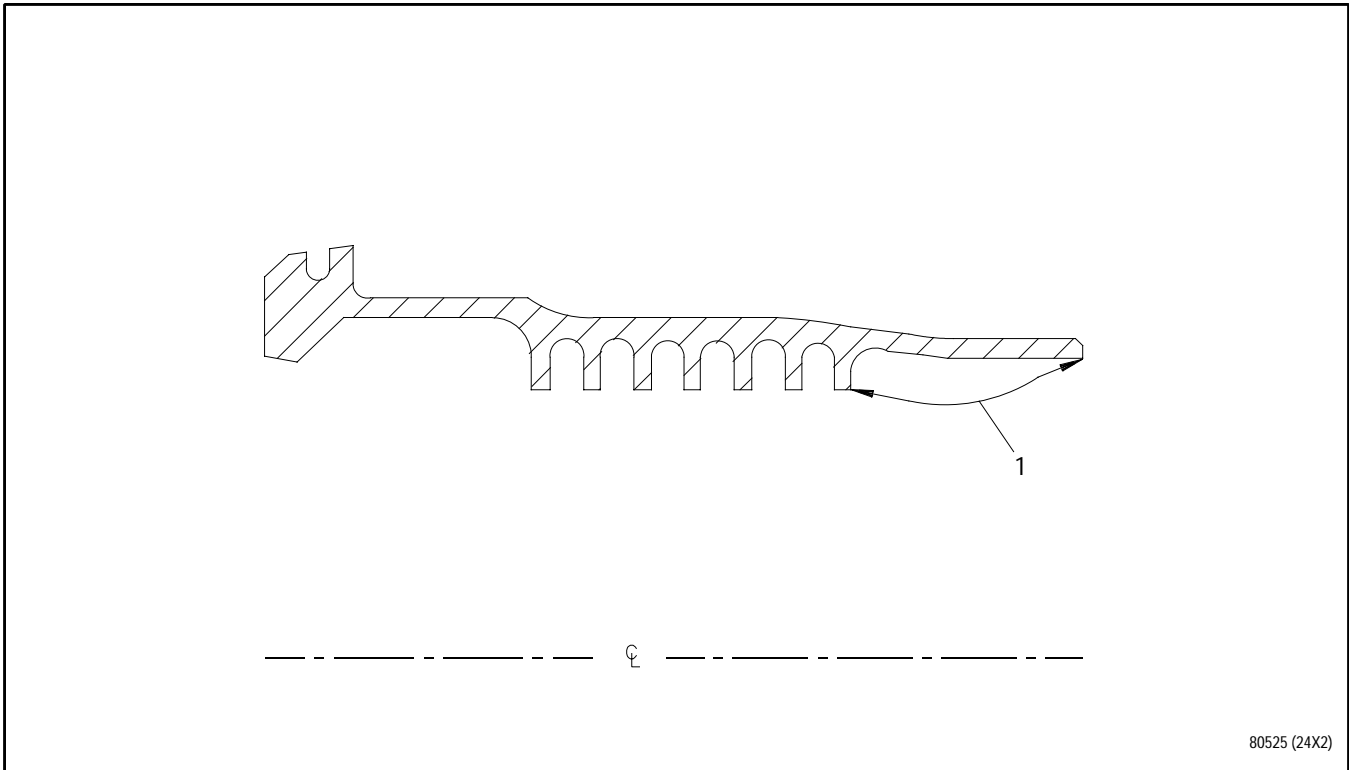


80524 (24X2)

1. Masking areas.
2. Grit blast areas.

Figure 18. Third Stage Fan Air Seal-Grit Blast

- h. Apply primer to aft location area as follows: (See figure 19.)
 - (1) Clean aft area by wiping with isopropyl alcohol. Air dry for 15 minutes.
 - (2) Apply PWA 556 primer to aft location area, within 30 minutes after cleaning, to a nominal thickness of 0.0001 inch. Use clean cheesecloth or brush for each part to remove overspray. Do not contaminate bond area. Refer to T.O. 2J-F100-53-1, WP 100 00.
 - (3) Cure primer at room temperature and 50% minimum relative humidity for two hours minimum and a maximum of 24 hours prior to injection of silicone rubber.
 - (4) Visually inspect primed area. Primed surface should have a faintly visible pink coloration. A white color indicates the film is too thick. If there is no visible coloration, film may not be continuous. If color is bright or streaky bright, film is too thick.
 - (5) If application of rubber sealant cannot be accomplished by 24 hours maximum following primer application, part shall be grit blasted and reprimed.

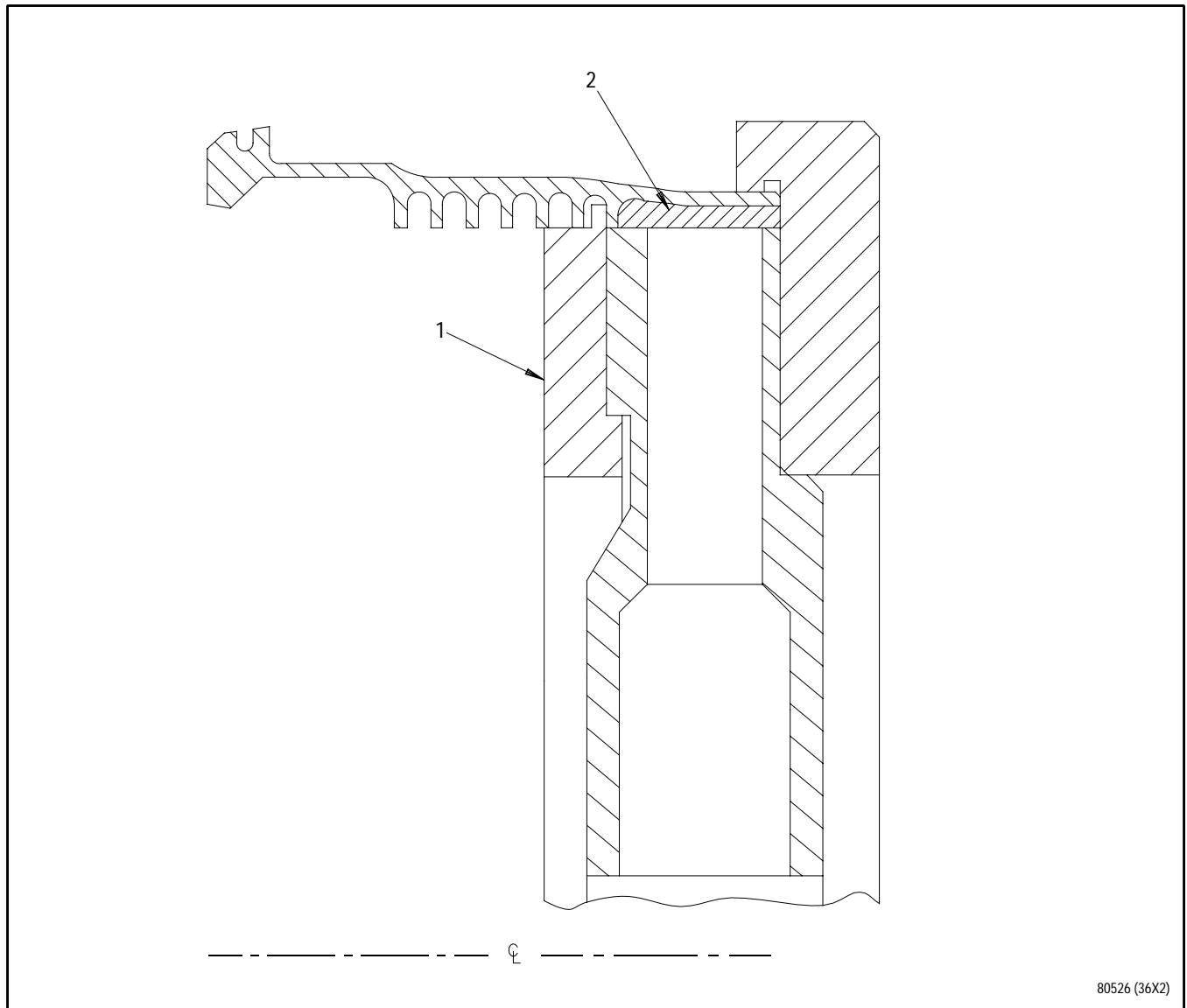


80525 (24X2)

1. Primer application area.

Figure 19. Third Stage Fan Air Seal-Primer Application (Aft Location)

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>i. Assemble air seal into PWA 70596 mold fixture for silicone rubber application on air seal aft location. (See figure 20.)</p> <p>j. Inject PWA 407 silicone rubber into mold. (See figure 5.) Refer to T.O. 2J-F100-53-1, WP 100 00.</p> | <p>k. Cure rubber at 300°F(149°C) for one hour minimum after seal reaches this temperature in mold. Refer to T.O. 2J-F100-53-1, WP 100 00.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|



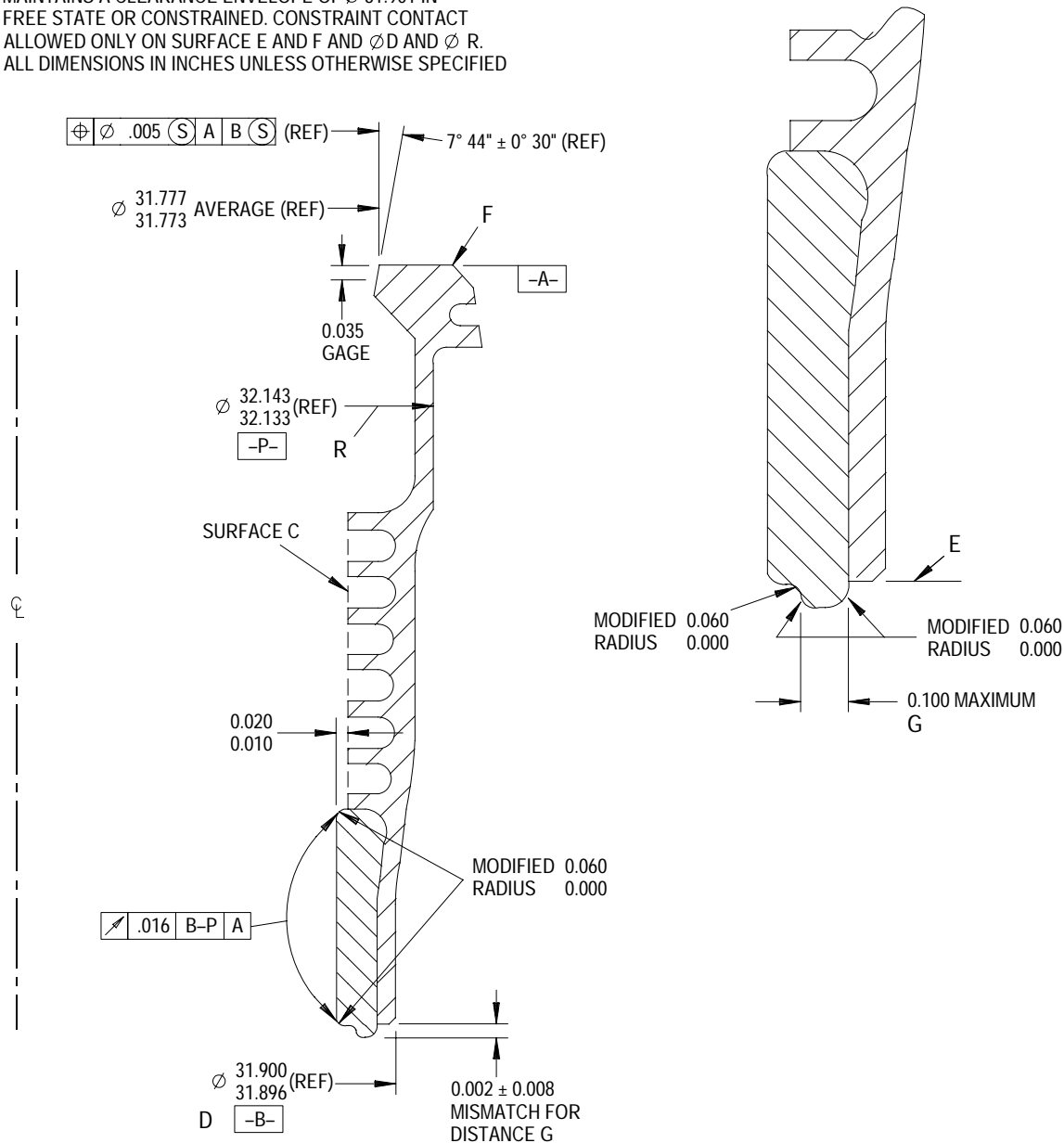
- 1. PWA 70596 mold fixture
- 2. Rubber injection area.

Figure 20. Third Stage Fan Air Seal-Silicone Rubber Application (Aft Location)

- l. Remove air seal from tool fixture. Remove rubber flashing and check rubber dimensions per figure 21.
- m. Clean forward bond area that has been previously grit blasted by wiping with isopropyl alcohol and air dry for 15 minutes minimum. (See figure 22.)
- n. Apply PWA 556 primer to forward location area using same procedures specified previously for aft location area. (See figure 22.)

NOTE

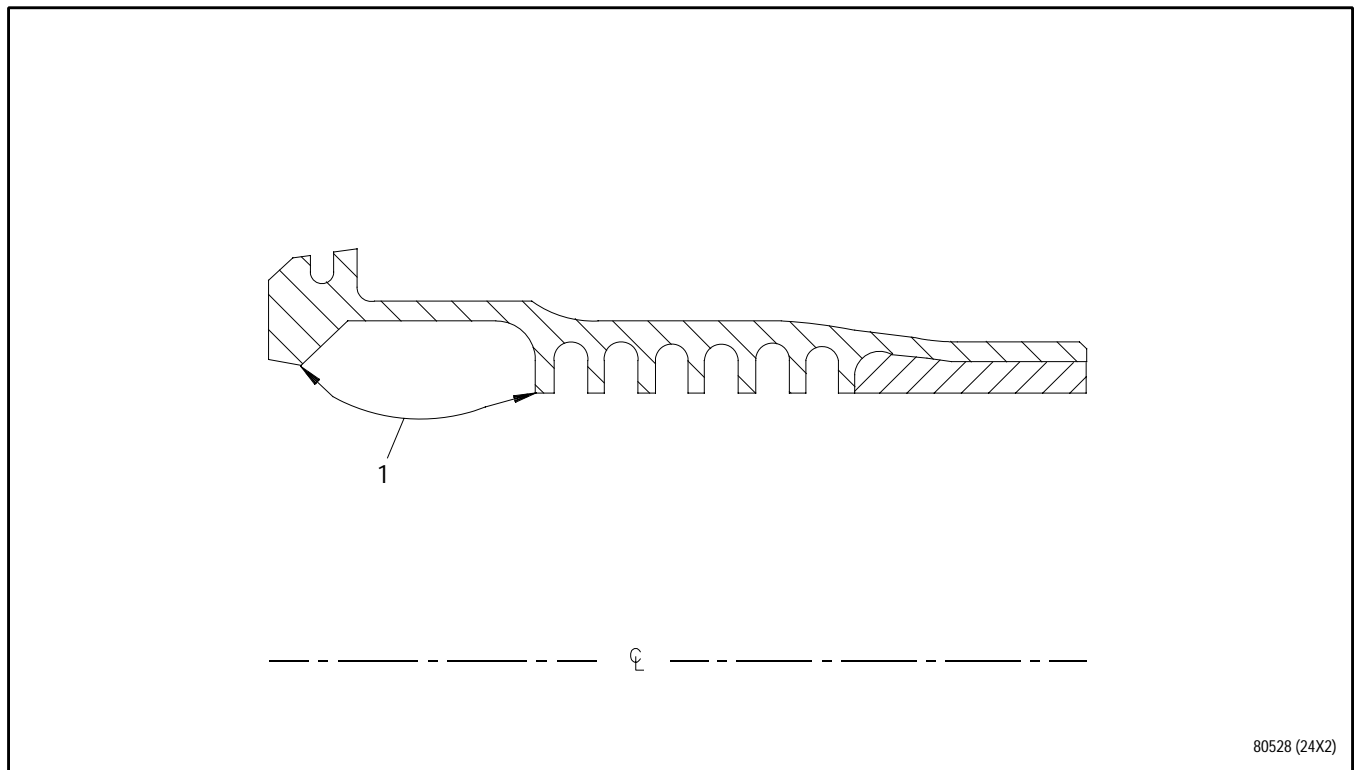
- UNLESS OTHERWISE SPECIFIED ALL DIAMETERS $\boxed{\oplus \varnothing .010 \text{ (S) A B (S)}}$
- UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS APPLY WHEN SURFACE F IS $\boxed{\square .001}$ AND $\varnothing D$ MAINTAINS A CLEARANCE ENVELOPE OF $\varnothing 31.901$ IN FREE STATE OR CONSTRAINED. CONSTRAINT CONTACT ALLOWED ONLY ON SURFACE E AND F AND $\varnothing D$ AND $\varnothing R$.
- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED



80527 (48X2)

Figure 21. Third Stage Fan Air Seal-Silicone Rubber Finish Machining (Aft Location)

- o. Assemble air seal into PWA 70595 mold fixture for silicone rubber application on air seal front location. (See figure 23.)
- p. Inject PWA 407 silicone rubber into mold. (See figure 23.) Refer to T.O. 2J-F100-53-1, WP 100 00.
- q. Cure rubber at 300°F(149°C) for one hour minimum after seal reaches this temperature in mold. Refer to T.O. 2J-F100-53-1, WP 100 00.
- r. Remove air seal from tooling.
- s. Inspect preliminary cured silicone rubber per figures 21 and 24. Refer to T.O. 2J-F100-53-1, WP 100 00.
 - (1) Visually inspect for voids and minor defects to be repaired.
 - (2) Visually inspect for discoloration. No gray rubber allowed.
 - (3) Repair minor defects in rubber, if required. Refer to T.O. 2J-F100-53-1, WP 100 00.



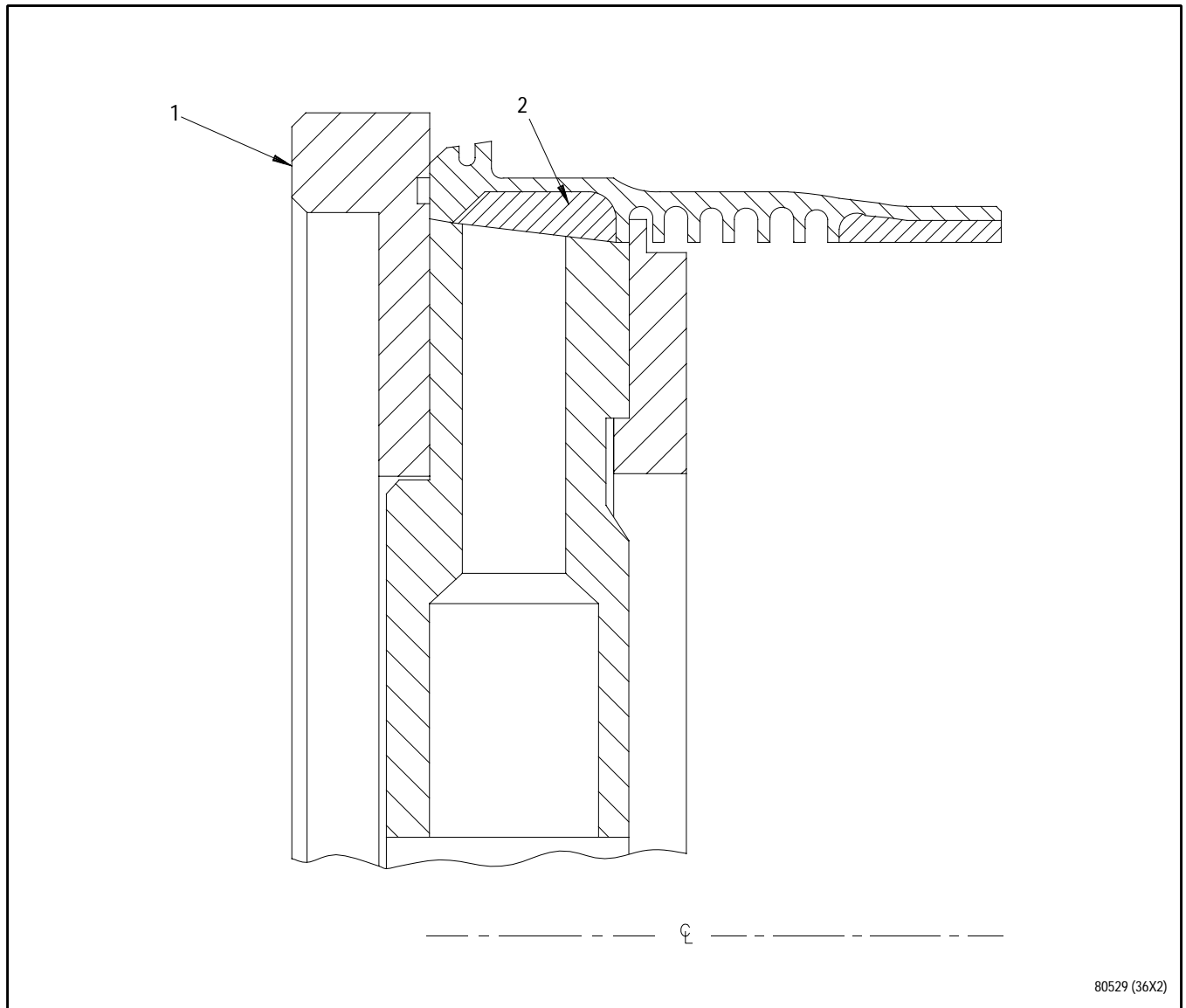
- 1. Primer application area.

Figure 22. Third Stage Fan Air Seal-Primer Application (Forward Location)

T.O. 2J-F100-53-6

WP 416 00

- t. Place airseal into oven without mold fixture. Cure at 390° to 410°F(198° to 210°C) for one hour to cure both front and aft rubber application areas.
- u. After completion of full cure, inspect for discoloration. No gray rubber is allowed. Refer to T.O. 2J-F100-53-1, WP 100 00.
- v. Perform hardness check. Refer to ASTM D2240. Hardness shall be within 52 to 65 durometer A. Hardness of locally repaired area shall be 40 to 65 durometer A.
- w. Check integrity of rubber to metal bond. Refer to T.O. 2J-F100-53-1, WP 101 00.
 - (1) Parts which show no signs of bulging or air leakage are acceptable.
 - (2) Parts which show any signs of bulging or air leakage shall be reprocessed. Refer to T.O. 2J-F100-53-1, WP 100 00.
- x. Finish machine silicone rubber per requirements shown in figures 21 and 24.

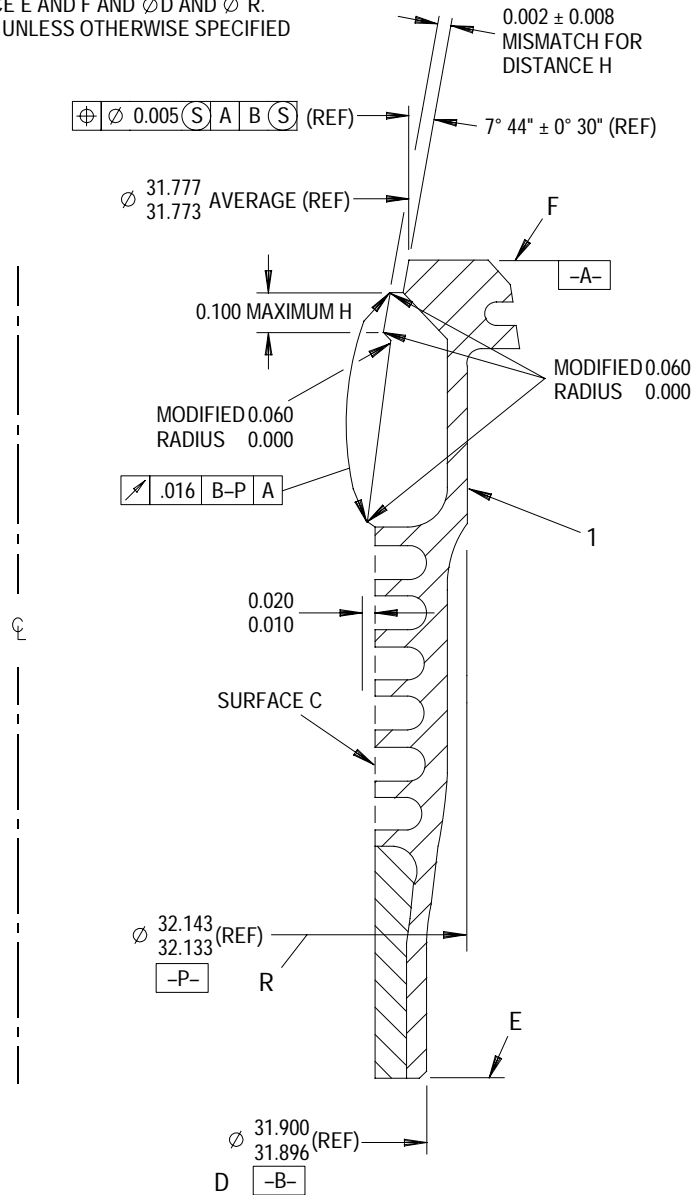


1. PWA 70595 mold fixture.
2. Rubber injection area.

Figure 23. Third Stage Fan Air Seal-Silicone Rubber Application (Forward Location)

NOTE

- UNLESS OTHERWISE SPECIFIED ALL DIAMETERS $\boxed{\oplus \varnothing .010 (S) A B (S)}$
- UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS APPLY WHEN SURFACE F IS $\boxed{\nabla .001}$ AND $\varnothing D$ MAINTAINS A CLEARANCE ENVELOPE OF $\varnothing 31.901$ IN FREE STATE OR CONSTRAINED. CONSTRAINT CONTACT ALLOWED ONLY ON SURFACE E AND F AND $\varnothing D$ AND $\varnothing R$.
- ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED



80530 (48X2)

Figure 24. Third Stage Fan Air Seal-Silicone Rubber Finish Machining (Forward Location)

WORK PACKAGE

TECHNICAL PROCEDURES

COMPRESSOR STATOR ASSEMBLY (FIRST AND SECOND STAGES) -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 58

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 58		24			

REFERENCE MATERIAL REQUIRED

Title	Number
AMERICAN SOCIETY FOR TESTING AND MATERIALS - - - - -	ASTM
STANDARD MAINTENANCE PROCEDURES - - - - -	T.O. 2-1-111
NONDESTRUCTIVE INSPECTION - - - - -	T.O. 2J-F100-9
INTRODUCTION AND GENERAL INFORMATION - - - - -	T.O. 2J-F100-53-1
SILICONE RUBBER (PWA 407) - GENERAL STORAGE, PREPARATION, AND APPLICABLE INSTUCTIONS - - - - -	WP 100 00
NONDESTRUCTIVE TEST FOR RUBBER TO METAL BOND USING PWA 52879 CHECKING FIXTURE - - - - -	WP 101 00
QUALIFIED REPAIR SOURCE LIST (QRSL) INLET/FAN MODULE - -	WP 602 00
INLET FAN MODULE - - - - -	T.O. 2J-F100-53-6
COMPRESSOR STATOR ASSEMBLY (FIRST AND SECOND STAGES) - INSPECTION - - - - -	WP 318 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
ALCOHOL, ISOPROPYL	TT-I-735
BRUSH, NYLON BRISTLE	-
CLOTH, LINT FREE	CCC-C-440
CLOTH, SILICON CARBIDE	90 GRIT
GLOVES, NYLON	-
PAPER, ALUMINUM OXIDE	300 GRIT
PAPER, KRAFT	PMC 4127-1
PRIMER, ADHESIVE SEALANT	PWA 556/DC1200
SEALANT, RUBBER ADHESIVE	PWA 36003
SEALANT, RUBBER	PWA 36029
SERMETAL 249	PWA 548
SERMETAL CATALYST 273	-
SILICON CARBIDE #60	PMC 3139-1
SILICONE RUBBER	PWA 407
TAPE, ALUMINIZED	PMC 4235-1, PMC 4235-2, PMC 4235-3
TAPE, MASKING METALLIC (LEAD FOIL)	PMC 4138/SCOTCH NO. 421
TAPE, TEFLON	-
TAPE	PMC 4134-1, PMC 4134-2, PMC 4134-3

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
PIN, RETAINING	4075247	4 PER VANE

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
3	FIRST STAGE COMPRESSOR STATOR ASSEMBLY - AIR SEALING RING SILICONE RUBBER REPLACEMENT	
	FIXTURE, WATER JET, 1ST AND 2ND STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71280
	MASK, WATER JET, 1ST STAGE COMPRESSOR COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71597
	MASK, GRITBLAST, 1ST STAGE STATOR COMPRESSOR ASSEMBLY - - - - -	PWA 71596
	MASK, GRITBLAST, 1ST STAGE STATOR COMPRESSOR ASSEMBLY - - - - -	PWA 71610
	FIXTURE, MOLD, 1ST STAGE COMPRESSOR STATOR ASSEMBLY	PWA 71261
	FIXTURE, MACHINING, 1ST STAGE COMPRESSOR STATOR ASSEMBLY INNER AIRSEAL - - - - -	PWA 71263
	CART, HYDRAULIC, 6TH THRU 12TH STAGE COMPRESSOR STATORS - - - - -	PWA 70394
	MASTER, INDICATOR GAGE, 1ST STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71267
	GAGE, INDICATOR ID, 1ST STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71264
	MASTER, INDICATOR GAGE, 1ST STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71265
	GAGE, INDICATOR ID, 1ST STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71266

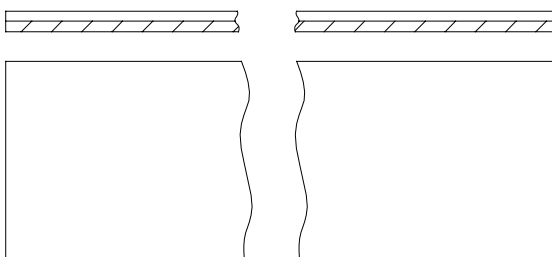
APPLICABLE SUPPORT EQUIPMENT (continued)

Paragraph	Function - Tool Nomenclature	Tool Number
4	SECOND STAGE COMPRESSOR STATOR ASSEMBLY - AIR SEALING RING SILICONE RUBBER REPLACEMENT	
	FIXTURE, WATER JET, 1ST AND 2ND STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71280
	MASK, WATER JET, 2ND STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71595
	MASK, GRITBLAST, 2ND STAGE STATOR COMPRESSOR ASSEMBLY - - - - -	PWA 71609
	MASK, GRITBLAST, 2ND STAGE STATOR COMPRESSOR ASSEMBLY - - - - -	PWA 71594
	FIXTURE, MOLD, 2ND STAGE COMPRESSOR STATOR ASSY - - -	PWA 71262
	FIXTURE, MACHINING, 2ND STAGE COMPRESSOR STATOR ASSEMBLY INNER AIRSEAL - - - - -	PWA 71268
	CART, HYDRAULIC, 6TH THRU 12TH STAGE COMPRESSOR STATORS - - - - -	PWA 70394
	MASTER, INDICATOR GAGE, 2ND STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71272
	GAGE, INDICATOR ID, 2ND STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71269
	MASTER, INDICATOR GAGE, 2ND STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71270
	GAGE, INDICATOR ID, 2ND STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71271
5	FIRST STAGE COMPRESSOR STATOR ASSEMBLY - STATOR VANE REMOVAL AND REPLACEMENT	
	FIXTURE, DRILL, 1ST STAGE COMPRESSOR STATOR ASSEMBLY INNER AIRSEAL (REAR) - - - - -	PWA 71275
	FIXTURE, DRILL, 1ST STAGE COMPRESSOR STATOR ASSEMBLY INNER AIRSEAL (FORWARD) - - - - -	PWA 71277
	FIXTURE, DRILL, 1ST STAGE STATOR VANE, REAR FLANGE -	PWA 71546
	FIXTURE, DRILL, 1ST STAGE STATOR VANE, FORWARD FLANGE - - - - -	PWA 71545
	ADAPTER, FLARING, 1ST AND 2ND STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71273

APPLICABLE SUPPORT EQUIPMENT (continued)

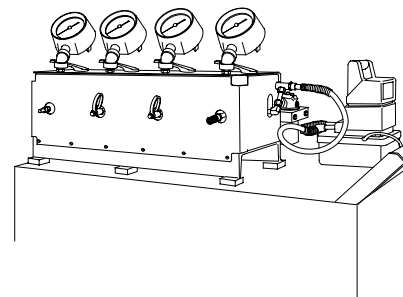
Paragraph	Function - Tool Nomenclature	Tool Number
6	SECOND STAGE COMPRESSOR STATOR ASSEMBLY - STATOR VANE REMOVAL AND REPLACEMENT	
	FIXTURE, DRILL, 2ND STAGE COMPRESSOR STATOR ASSEMBLY INNER AIRSEAL (REAR) - - - - -	PWA 71276
	FIXTURE, DRILL, 2ND STAGE COMPRESSOR STATOR ASSEMBLY INNER AIRSEAL (FORWARD) - - - - -	PWA 71278
	FIXTURE, DRILL, 2ND STAGE STATOR VANE, REAR FLANGE -	PWA 71548
	FIXTURE, DRILL, 2ND STAGE STATOR VANE, FORWARD FLANGE - - - - -	PWA 71547
	ADAPTER, FLARING, 1ST AND 2ND STAGE COMPRESSOR STATOR ASSEMBLY - - - - -	PWA 71273
7	FIRST AND SECOND STAGE COMPRESSOR STATOR ASSEMBLIES - AIR SEALING RING RUBBER LOCAL REPAIR	
	MOLD, SHEET METAL - - - - -	LM 1093

ILLUSTRATED SUPPORT EQUIPMENT



LM 1093

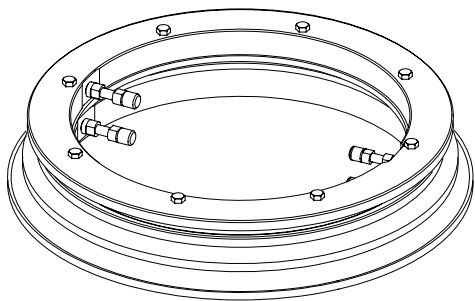
Figure T1. LM 1093 MOLD



PWA 70394 -C

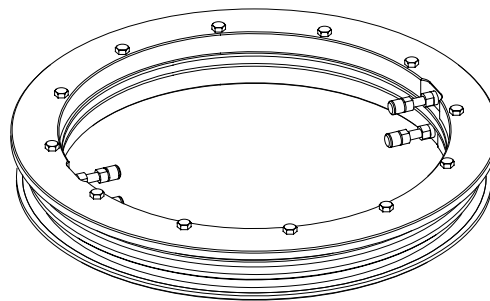
Figure T2. PWA 70394 CART

ILLUSTRATED SUPPORT EQUIPMENT (continued)



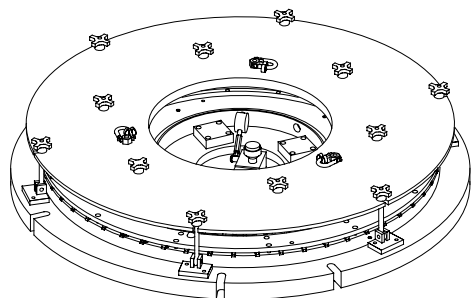
PWA 71261 -C

Figure T3. PWA 71261 FIXTURE



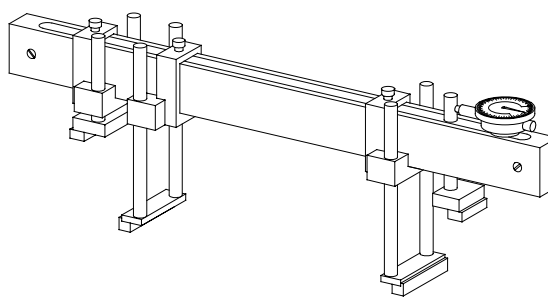
PWA 71262 -C

Figure T4. PWA 71262 FIXTURE



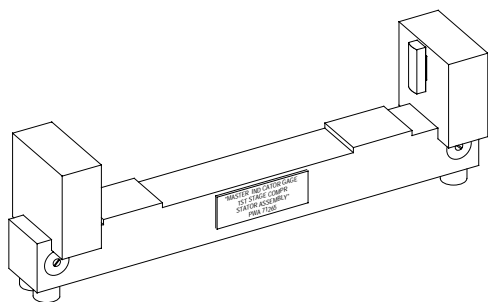
PWA 71263 -C

Figure T5. PWA 71263 FIXTURE



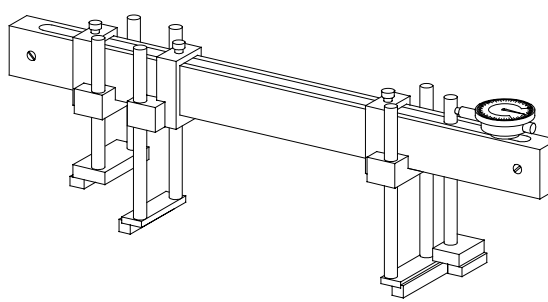
PWA 71264 -C

Figure T6. PWA 71264 GAGE



PWA 71265 -C

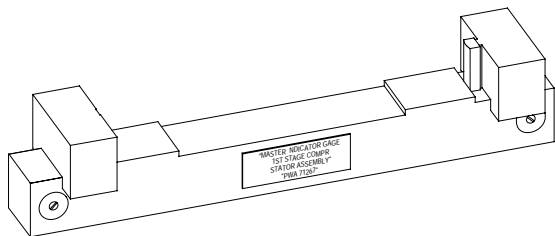
Figure T7. PWA 71265 MASTER



PWA 71266 -C

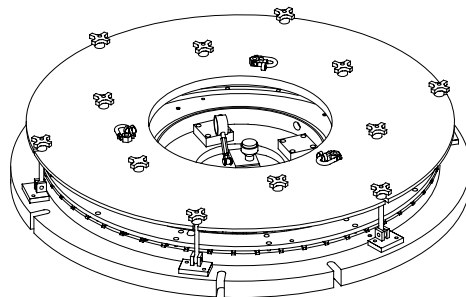
Figure T8. PWA 71266 GAGE

ILLUSTRATED SUPPORT EQUIPMENT (continued)



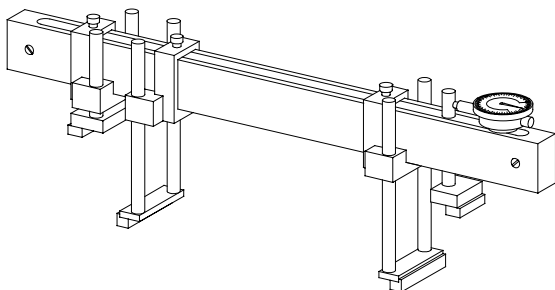
PWA 71267 -C

Figure T9. PWA 71267 MASTER



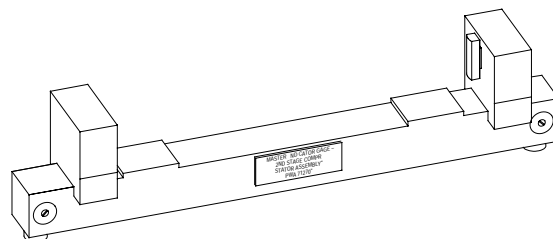
PWA 71268 -C

Figure T10. PWA 71268 FIXTURE



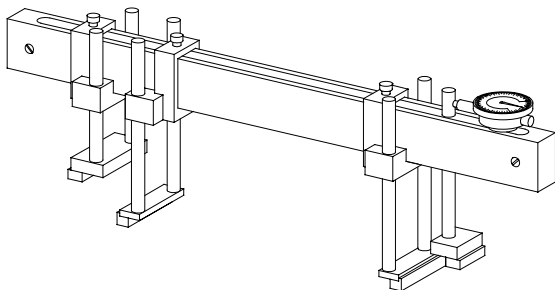
PWA 71269 -C

Figure T11. PWA 71269 GAGE



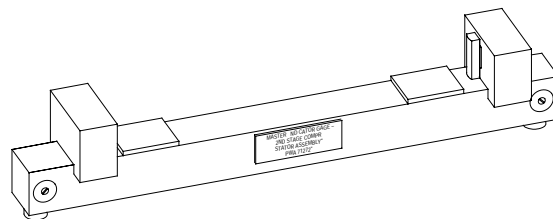
PWA 71270 -C

Figure T12. PWA 71270 MASTER



PWA 71271 -C

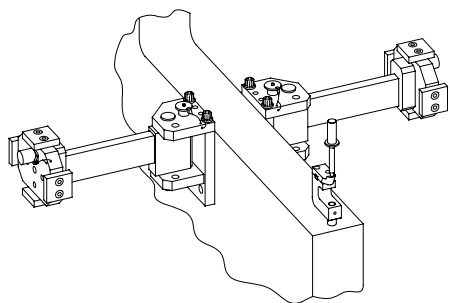
Figure T13. PWA 71271 GAGE



PWA 71272 -C

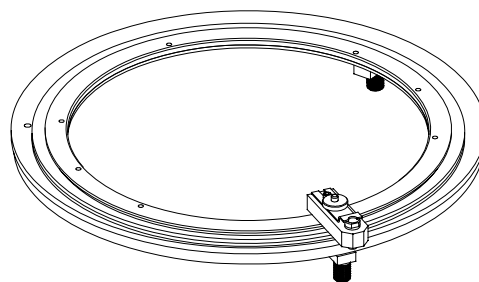
Figure T14. PWA 71272 MASTER

ILLUSTRATED SUPPORT EQUIPMENT (continued)



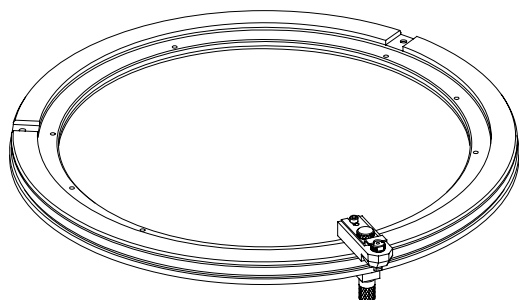
PWA 71273 -C

Figure T15. PWA 71273 ADAPTER



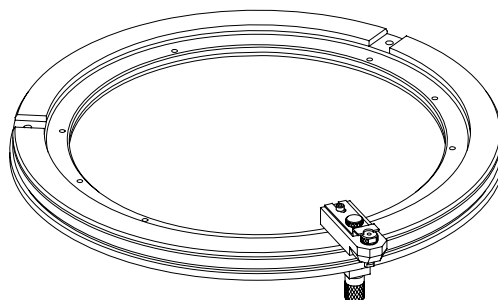
PWA 71275 -C

Figure T16. PWA 71275 FIXTURE



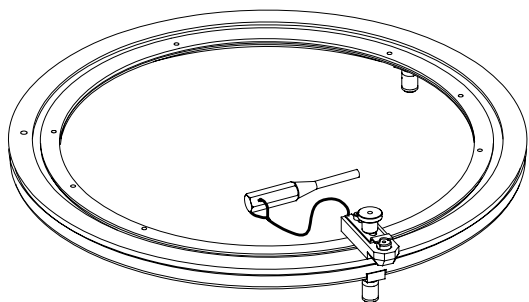
PWA 71276 -C

Figure T17. PWA 71276 FIXTURE



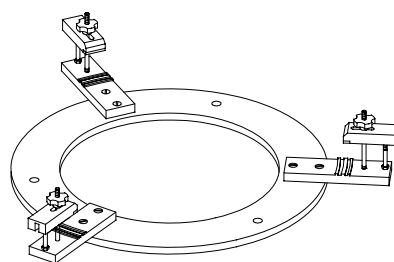
PWA 71277 -C

Figure T18. PWA 71277 FIXTURE



PWA 71278 -C

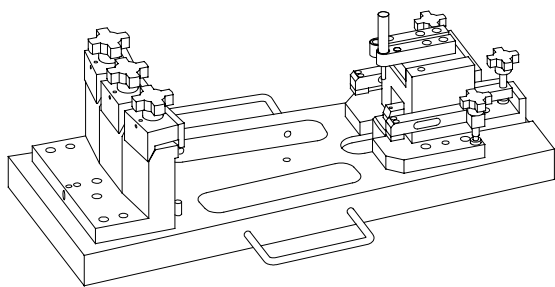
Figure T19. PWA 71278 FIXTURE



PWA 71280 -C

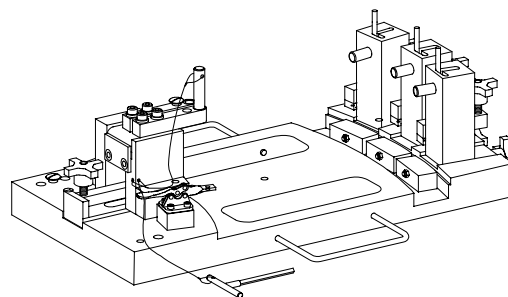
Figure T20. PWA 71280 FIXTURE

ILLUSTRATED SUPPORT EQUIPMENT (continued)



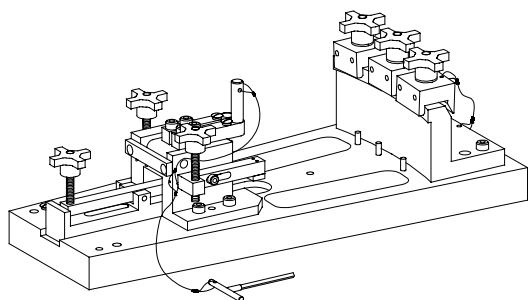
PWA 71545 -C

Figure T21. PWA 71545 FIXTURE



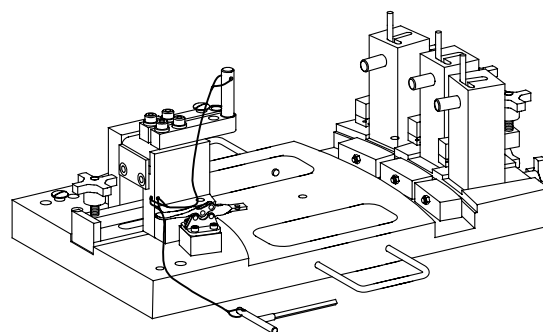
PWA 71546 -C

Figure T22. PWA 71546 FIXTURE



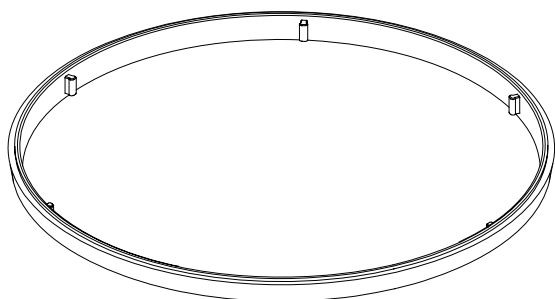
PWA 71547 -C

Figure T23. PWA 71547 FIXTURE



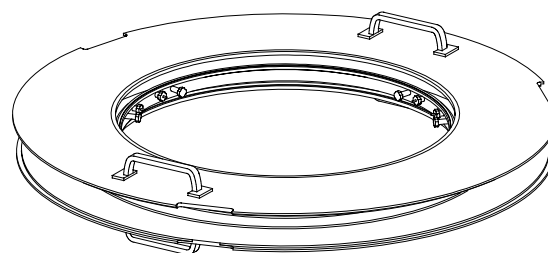
PWA 71548 -C

Figure T24. PWA 71548 FIXTURE



PWA 71594 -C

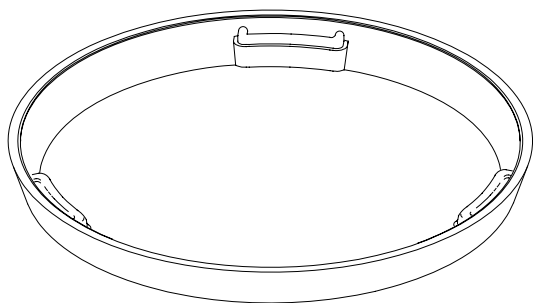
Figure T25. PWA 71594 MASK



PWA 71595 -C

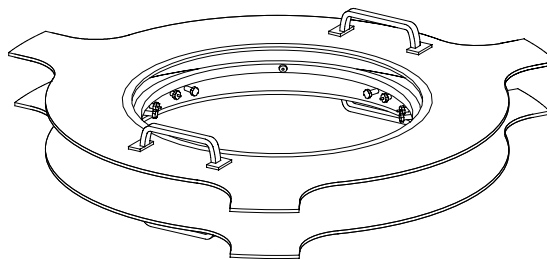
Figure T26. PWA 71595 MASK

ILLUSTRATED SUPPORT EQUIPMENT (continued)



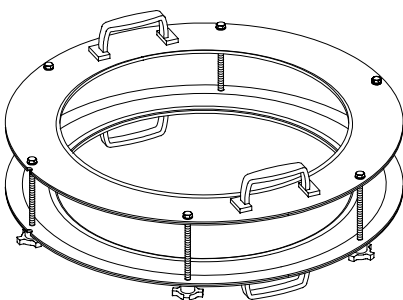
PWA 71596 -C

Figure T27. PWA 71596 MASK



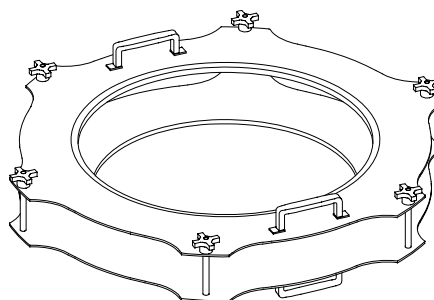
PWA 71597 -C

Figure T28. PWA 71597 MASK



PWA 71609 -C

Figure T29. PWA 71609 MASK



PWA 71610 -C

Figure T30. PWA 71610 MASK

1. INTRODUCTION.

- a. This work package contains instructions for repair of 1st and 2nd stage compressor stator assemblies.

2. FIRST AND SECOND STAGE COMPRESSOR STATOR ASSEMBLIES - VANE BLENDING AND VANE CORROSION REPAIR.

- a. Limits stated in WP 318 00 pertain to isolated damage areas and shall not be interpreted as authority for removal of material all across leading or trailing edge as might be done in a single machine cut.
- b. Minor damage shall be repaired by blending, using fine files and/or stones. Length of scallop blend shall be between 4 and 5 times blend depth. Remove minimum material as required within these limits. Surface finish must compare to that of new part. All blend radii shall be smooth and gently rounded with no sharp corners. Break sharp edges in blend area 0.005 to 0.015 inch radius. Maximum reparable limits in WP 318 00 shall be maintained.
- c. All blend repaired damage and acceptable round-bottom dents shall be nondestructive inspected for cracks. Refer to T.O. 2J-F100-9. No cracks are allowed.



Touching blended area with bare hands after cleaning may result in degraded bond.

- d. Clean all grease and oil from blended areas using clean lint-free cloth moistened with isopropyl alcohol. Do not touch with bare hands.

- e. Coat blended areas with Sermetel 249 (PWA 548) and air dry 15 to 30 minutes or until dry to touch. Refer to T.O.2-1-111, SPOP 162, Option 1.
- f. Spray, brush or swab coated surfaces with Sermetel 273 catalyst. Allow to stand 1 hour.
- g. Wash with water and blow dry with air not to exceed 30 psig.

3. FIRST STAGE COMPRESSOR STATOR ASSEMBLY - AIR SEALING RING SILICONE RUBBER REPLACEMENT.

(See Figures 1 through 4.)



Failure to exercise care when removing rubber may result in damage to parent material and to retaining pins within the rubber.

NOTE

Waterjet stripping of PWA 407 rubber is a source qualified procedure. Refer to T.O.2J-F100-53-1, WP 602 00 for approved procedure number and for additional qualified sources.

- a. Remove existing air sealing ring rubber by conventional methods per T.O.2J-F100-53-1, WP 100 00, or by water stripping as follows:

(1) Install PWA 71280 fixture on waterjet machine work table.

- (a) Place fixture onto outriggers of waterjet machine work table with fixture base positioned with alignment marks located on sides of outrigger arms.



Failure to secure clamps to inside diameter of fixture may cause interference with stator assembly.

- (b) Secure fixture to work table with clamps on inside diameter of fixture.
- (2) Install inside mask detail of PWA 71597 mask into inner cavity of air sealing ring.
 - (a) Place stator assembly on clean work table, rear side up.

NOTE

Inside mask detail of PWA 71597 mask consists of one full ring and three split ring segments. Ring segment heights are manually adjusted using cam knobs to seal air sealing ring inner cavity.

- (b) Loosen inside mask detail cam knobs and swing clamps. Remove three split ring segments.
- (c) Install inside mask detail full ring into air sealing ring cavity with angled surface of ring corresponding to cavity angle and bottom of ring against air sealing front flange.
- (d) Install ring segments over full ring posts. Segment with two angled ends is installed last.
- (e) Rotate cam knobs to raise ring segments firmly against air sealing ring rear flange. Tighten swing clamps to secure.
- (3) Install stator assembly into PWA 71280 fixture.

NOTE

PWA 71280 fixture arms are marked on their sides to identify adjacent snap diameter ridges on surface of arms which correspond with appropriate outer snap diameter of stator assembly to be installed.

- (a) Place stator assembly onto fixture arms positioning the outer snap diameter into corresponding fixture snap diameter ridge. Rotate part slightly to assure proper seating. Part should be centered in fixture if properly positioned.

NOTE

PWA 71597 mask contains two different cover plates. Cover plate marked DET#1 is used if stator assembly forward diameter is facing upward. Cover plate marked DET#2 is used if rear diameter is facing upward.

- (b) Place appropriate PWA 71597 mask cover plate, rubber pad towards part, onto stator assembly aligning three legs of plate with PWA 71280 fixture clamps.
- (c) Rotate three PWA 71280 fixture clamp plates over mask cover plate and stator assembly and tighten clamps to secure.
- (4) Waterjet strip rubber from air sealing ring using approved process. Refer to T.O.2J-F100-53-1, WP 602 00.
- (5) Loosen PWA 71280 fixture clamps, remove PWA 71597 mask cover plate, and remove stator assembly from fixture. Do not remove inside mask detail.

- (6) Invert stator assembly and repeat installation procedure into PWA 71280 fixture using other PWA 71597 mask cover plate.
- (7) Waterjet strip rubber from air sealing ring using approved process. Refer to T.O.2J-F100-53-1, WP 602 00.
- (8) Remove stator assembly from fixture.
- (9) Remove tooling.
- b. Visually inspect air sealing ring to verify complete removal of PWA 407 rubber.
- c. Fluorescent penetrant inspect. Refer to T.O.2-1-111, SPOP 62. No cracks allowed.
- d. Inspect retaining pins for looseness or damage. Replace loose or damaged retaining pins per paragraph 5.
- e. Mask air sealing ring prior to dry abrasive blast using lead foil tape (PMC 4138) or PWA 71610 mask and PWA 71596 mask. (See figure 1.)
- (1) Install PWA 71610 mask as follows:
 - (a) Place mask on table with hand knobs up.
 - (b) Loosen and remove six hand knobs and remove mask cover.
 - (c) Wipe snap diameters of mask base and cover using clean rag.



Failure to use care during installation of stator assembly onto PWA 71610 mask base may cause damage to stator vanes.

- (d) Position stator assembly smallest (forward) inside diameter down, and slowly lower onto mask base using care as mask studs pass between stator vanes. Seat stator assembly into snap diameter of mask base.
- (e) Position alignment notch on outside diameter of mask cover with alignment notch on mask base and lower cover onto stator assembly engaging rear snap diameter of stator. Install and tighten six hand knobs to secure.
- (2) Insert PWA 71596 mask into inner cavity of stator assembly air sealing ring by pushing into cavity until stepped snap diameters of mask are locked under air sealing ring flanges.



Failure to regulate pressure during dry abrasive blast may result in air sealing ring distortion.

- f. Dry abrasive blast air sealing ring flanges (1, figure 2) per PWA 83-B1 with No. 60-325 mesh nonmetallic grit. (Refer to T.O.2J-F100-53-1, WP 100 00.) Use 50 to 70 psig. Overspray permitted.

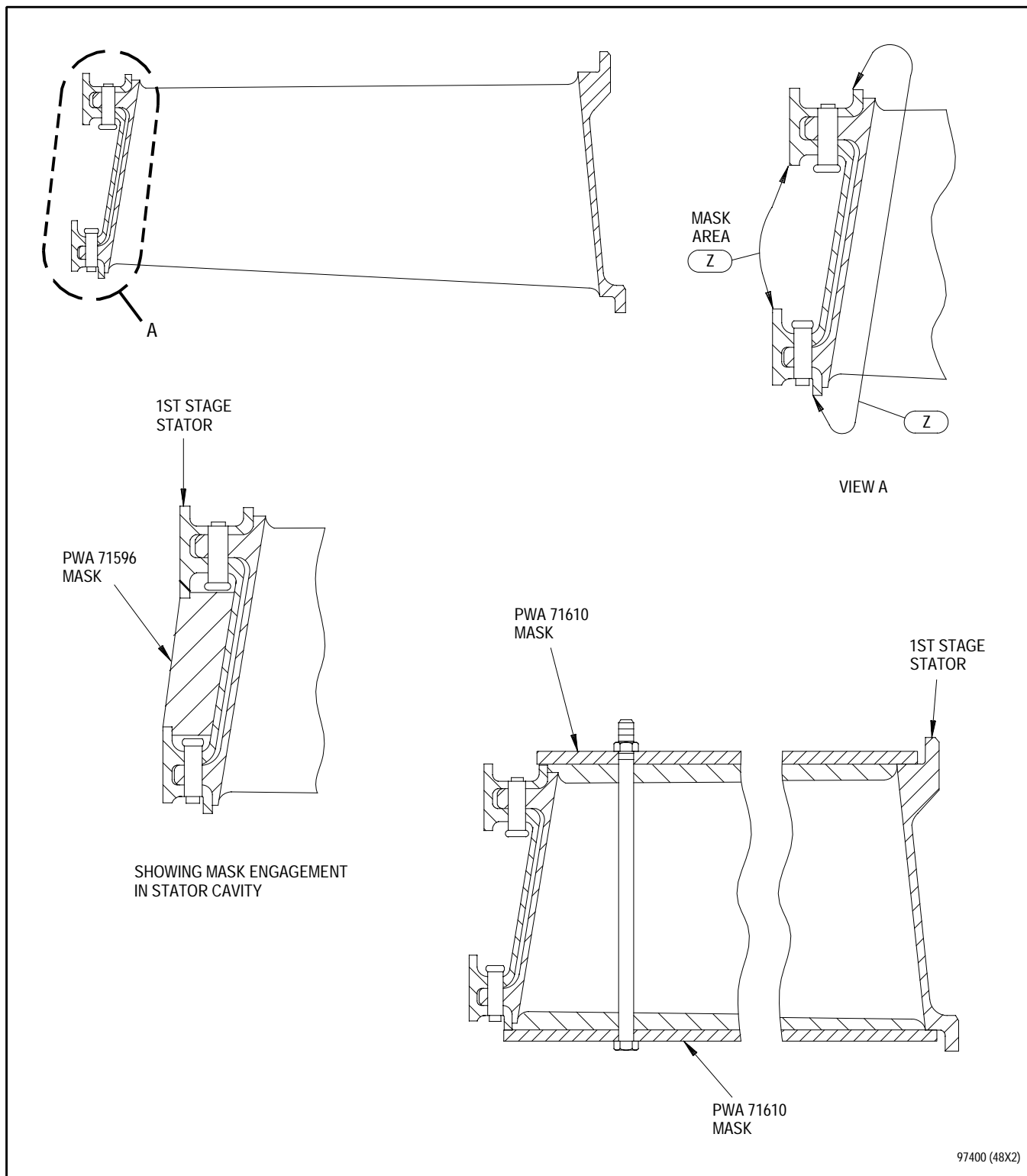


Figure 1. First Stage Compressor Stator Assembly - Masking Locations for Grit Blast

- g. Visually inspect to ensure complete removal of old rubber. Grit blasted surfaces shall have a uniform matte finish. Vacuum off grit residue.
- h. Remove PWA 71596 mask from air sealing ring cavity.
- i. Remove stator assembly from PWA 71610 mask.

- (1) Loosen and remove hand knobs and lift mask cover from stator assembly.



Failure to use care during removal of stator assembly from PWA 71610 mask base may result in damage to stator vanes.

- (2) Slowly lift and remove stator assembly from mask base using care as mask studs pass between stator vanes.



Touching repair area with bare hands after cleaning may result in degraded rubber bond.

NOTE

Isopropyl alcohol will attack residual masking tape and cause grit blast residue to stick.

- j. If lead foil tape was used for masking, remove tape prior to cleaning with isopropyl alcohol.
- k. Remove residual abrasive residue and clean area to be bonded prior to priming with isopropyl alcohol using squirt or pour type dispenser. Air dry for 15 minutes. Cleaned part shall be handled only with clean nylon gloves.

NOTE

When parts are not in bond room, wrap in neutral Kraft paper.

- l. Apply primer (PWA 556) to areas to be bonded within 20 minutes of cleaning. Refer to T.O.2J-F100-53-1, WP 100 00.



Failure to apply rubber within specified time limit may result in degraded bond.

NOTE

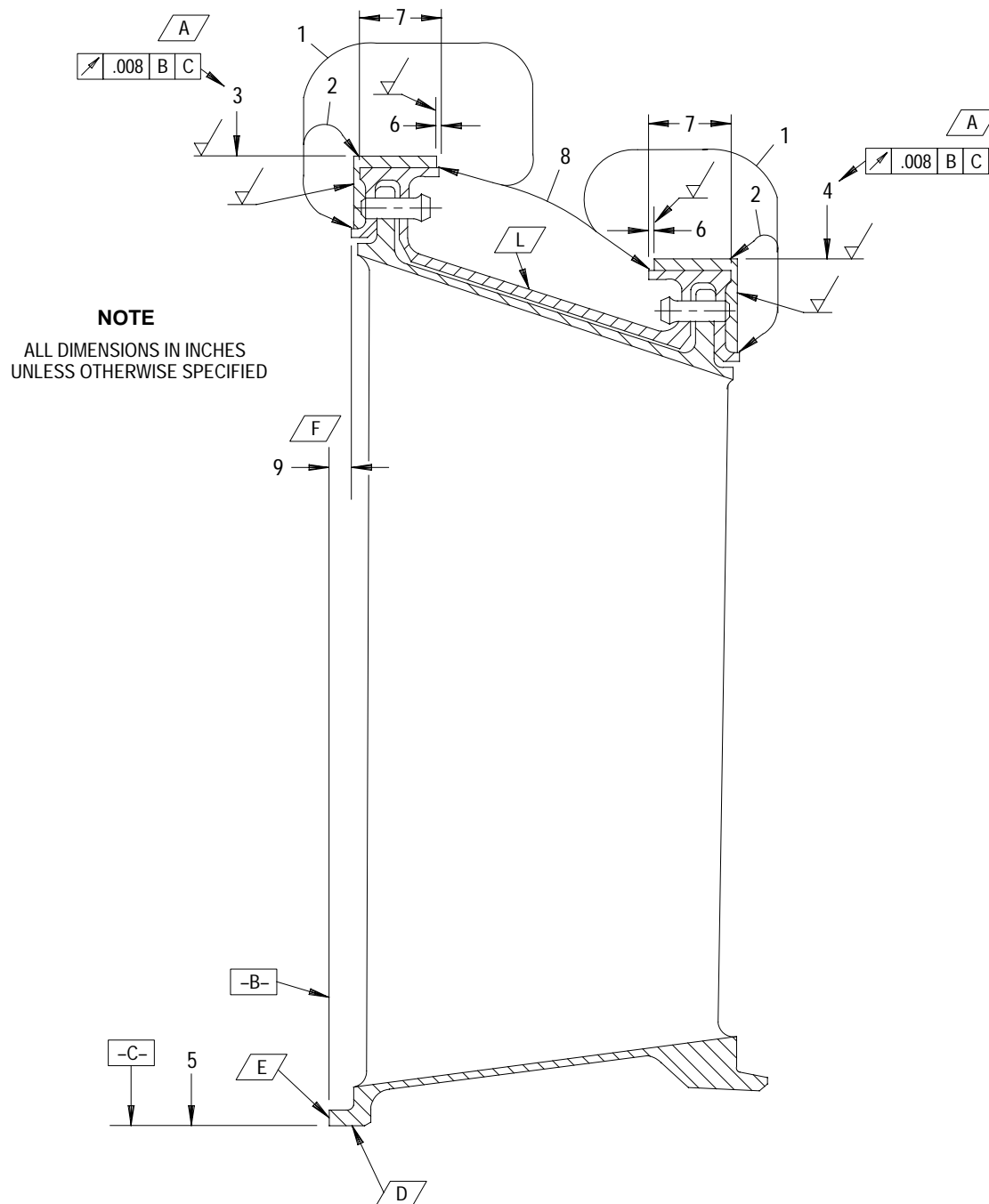
If rubber application cannot be accomplished within 24 hours, part must be recleaned and reprimed per preceding steps e. through l.

- m. Install stator assembly into PWA 71261 mold fixture. (See figure 3.)

NOTE

PWA 71261 mold fixture consists of two matched ring sets. Set for rear air sealing ring contains one full ring, segmented ring (four pieces), and 12 hex head cap screws. Set for front air sealing ring consists of two rings and eight hex head cap screws.

- (1) Clean interior (mold cavity) surfaces of rings and ring segments with isopropyl alcohol. Allow to dry.
- (2) Apply mold release agent to interior surfaces. Refer to T.O.2J-F100-53-1, WP 100 00.
- (3) Place ring(2, figure 3) on work bench, interior surface up.
- (4) Place stator assembly, forward (smallest inside diameter) side down, onto ring(2).



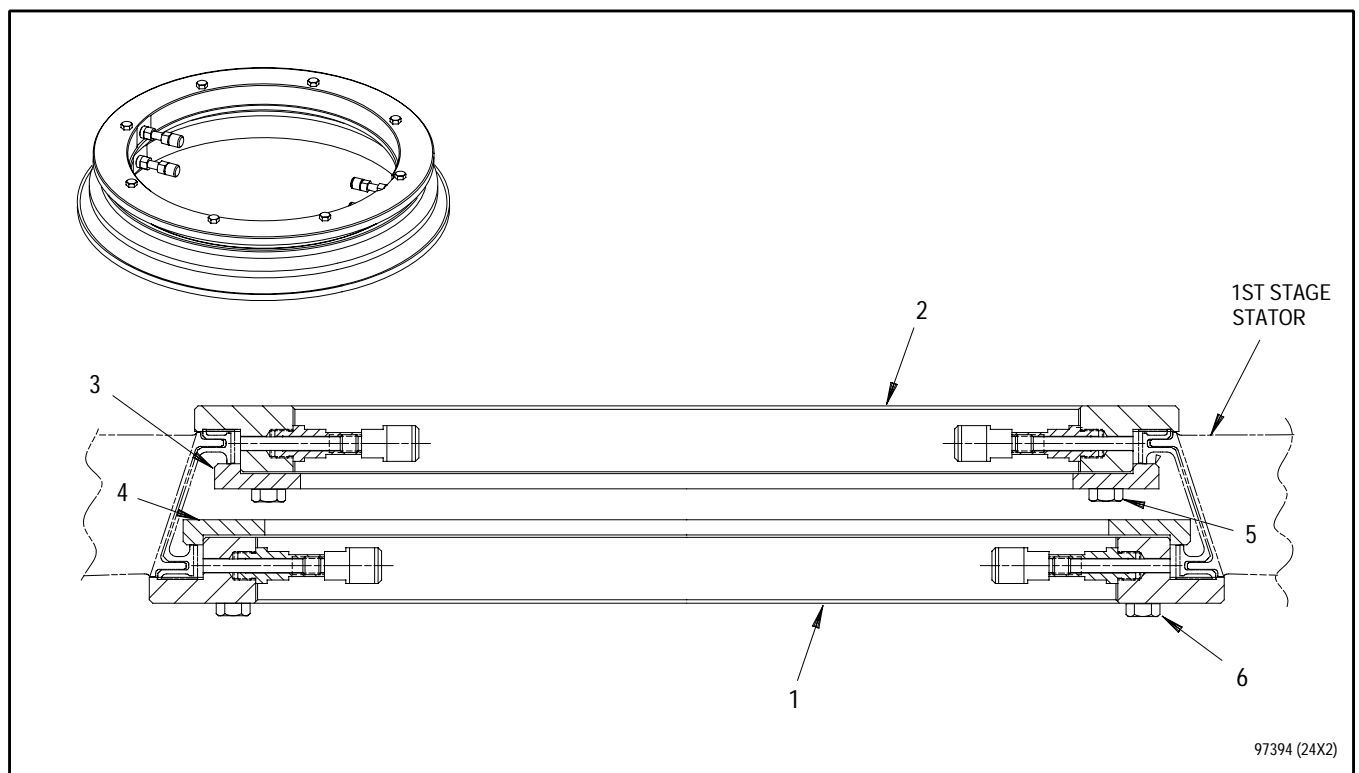
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Figure 2. First Stage Compressor Stator Assembly - Rubber Locations and Machining Dimensions

Legend for figure 2**NOTE**

Circular runout A applies to Diameters 3 and 4 when Surface D of front feet of all vanes are radially loaded against Diameter C, Surface E of all vanes are contacting Plane B, and Part L is positioned to Dimension F.

1. Location of PWA 556 primer and PWA 407 silicone rubber
2. Void permitted in this area provided they do not expose pins or base metal. Grey discoloration of rubber due to aeration during injection process is permitted in this area only. No grey rubber allowed after final cure.
3. 15.796 to 15.804 inch average diameter. Circular runout within 0.008 inches with respect to B and C. See constraint requirements above.
4. 17.096 to 17.104 inch average diameter. Circular runout within 0.008 inches with respect to B and C. See constraint requirements above.
5. 34.970 inch diameter, reference
6. Surface of rubber to be flush to 0.020 inch below adjoining surface, two places
7. 0.560 inch minimum
8. Grit blast not allowed in this area.
9. 0.185 to 0.205 inches



- | | |
|-----------------------------------|---------------------------------------------|
| 1. Rearward mold ring | 4. Rearward mold cavity seal plate assembly |
| 2. Forward mold ring | 5. Hex head cap screws, forward ring |
| 3. Forward mold cavity seal plate | 6. Hex head cap screws, rearward ring |

Figure 3. PWA 71261 Mold Fixture Installation

- (5) Install seal plate(3), interior surface down, into stator assembly cavity engaging ring(2). Secure with hex head cap screws(5).
- (6) Place ring(1) on work bench, interior surface up.
- (7) Turn stator assembly over and place onto ring(1) aligning nozzles with nozzles on ring(2).
- (8) Install seal plate segments(4), one at a time, interior surfaces down, onto ring(1) and lightly secure with cap screws(6). After all segments are installed, tighten cap screws.

NOTE

Stator assembly is positioned vertically with mold nozzles aligned vertically during injection of rubber into the mold. This allows air to be expelled from the mold as rubber fills the cavity to reduce possibility of air entrapment.

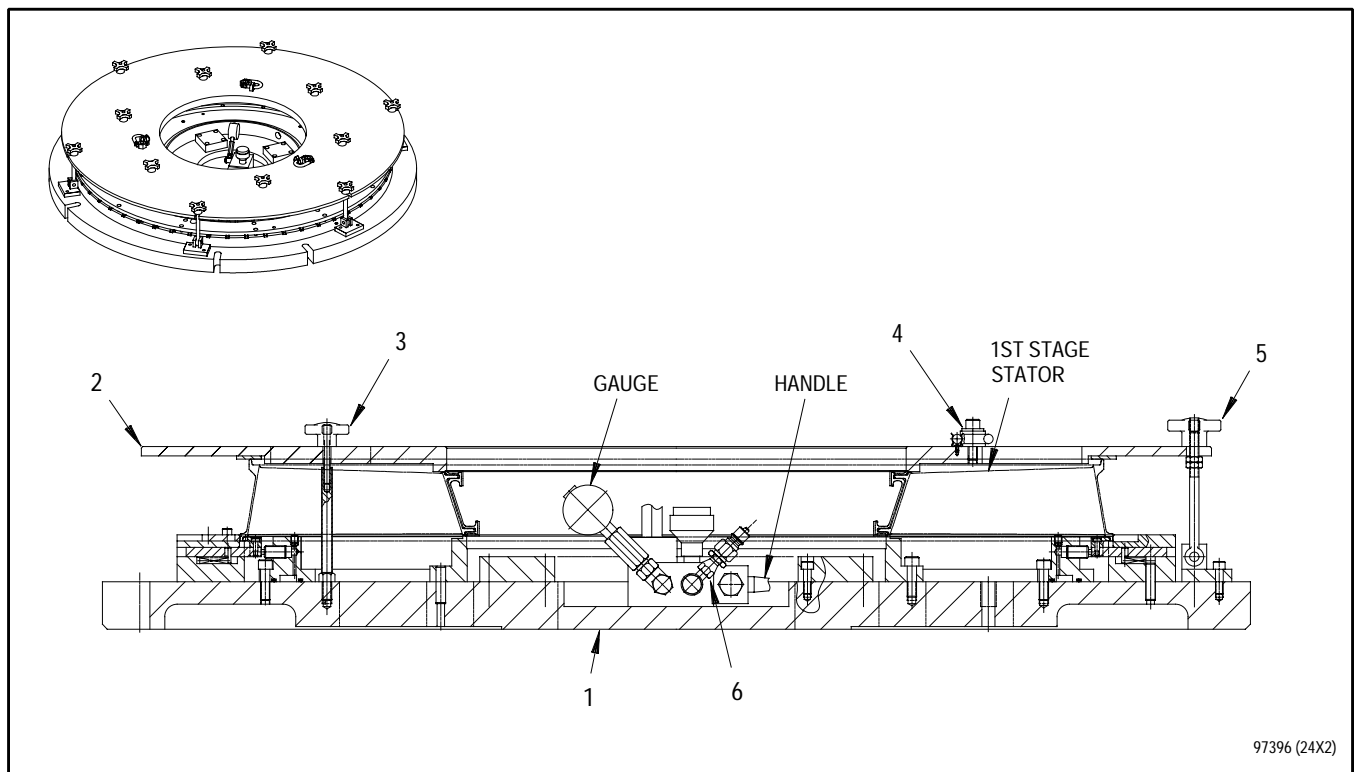
- (9) Place stator assembly in a vertical position with alignment of mold nozzles perpendicular to work bench surface.
- n. Within 2 to 24 hours after primer application, inject PWA 407 rubber into mold and cure rubber at 300°F (149°C) for 1 hour minimum after stator assembly reaches temperature in mold. Refer to T.O.2J-F100-53-1, WP 100.



Use care to not touch rubber when removing part from mold to avoid tearing rubber.

- o. After part cools, remove stator assembly from PWA 71261 mold.
- p. Inspect preliminarily cured silicone rubber per figure 2 and T.O.2J-F100-53-1, WP 100 00.
 - (1) Visually inspect for voids and defects. Refer to 2, figure 2 for areas and limitations where voids or defects are allowed.
 - (2) Visually inspect for discoloration. No grey rubber allowed except as shown in 2, figure 2.
 - (3) Repair minor defects in silicone rubber if necessary. Refer to T.O.2J-F100-53-1, WP 100 00.
- q. Place stator assembly into oven to final cure silicone rubber at 390° to 410°F (199° to 210°C) for 1 hour.
- r. Inspect silicone rubber after final cure per figure 2 and T.O.2J-F100-53-1, WP 100 00.
 - (1) Visually inspect for discoloration. No grey rubber allowed except as shown in 2, figure 2.
 - (2) Perform hardness check in accordance with ASTM D 2240. Hardness shall be within 52 to 65 Durometer A. Hardness of locally repaired area shall be within 40 to 65 Durometer A.
- s. Check integrity of rubber to metal bond. Refer to T.O.2J-F100-53-1, WP 101 00.

- (1) Parts which show no signs of bulging or air leakage are acceptable.
 - (2) Parts which show signs of bulging or air leakage must be reprocessed as applicable per preceding steps a. through s.
- t. Install stator assembly into PWA 71263 machining fixture. (See figure 4.)
- (1) Loosen and remove six hand knobs(3, figure 4)).
 - (2) Loosen six hand knobs(5) on swing clamps and swing clamps outboard.
 - (3) Install chain hoist sling hooks in swivel hoist rings(4) and remove top clamp plate(2).
 - (4) Install three 5/8-11 eye bolts in three equally spaced holes in base plate(1). Install chain hoist hooks in eye bolts and lift base plate onto center of machine work table. Lightly secure with T-nut clamps. Remove hoist and eye bolts.
 - (5) Center base plate(1) on machine work table within 0.001 inch FIR using indicator on inside track in top ring of base plate. Tighten T-nut clamps.



- | | |
|--------------------|-----------------------|
| 1. Base plate | 4. Swivel hoist rings |
| 2. Top clamp plate | 5. Hand knobs |
| 3. Hand knobs | 6. Flare fitting |

Figure 4. First Stage Compressor Stator Assembly - PWA 71263 Machining Fixture



Failure to use care when installing stator assembly onto PWA 71263 machining fixture base plate may damage stator vanes.

NOTE

Base plate has locator (antirotation) key on inside of snap which fits in outer flange slot between any two stator vanes when stator assembly is properly seated in fixture.

- (6) Position stator assembly forward air sealing ring flange down onto base plate(1) using care as base plate posts pass between stator vanes. Align base plate locator key with outer flange slot between any two stator vanes to seat stator assembly in base plate. If not seated, tap stator vane outer flange with rawhide mallet to seat.
- (7) Using hoist, position top clamp plate(2) onto stator assembly and base plate(1) aligning scribed alignment marks on both top clamp plate and base plate. Thread hand knobs(3) onto base plate posts until seated, but do not tighten.
- (8) Position swing clamps inboard to engage top clamp plate(2) and turn hand knobs(5) to seat, but do not tighten. Remove hoist and secure swivel hoist rings(4) into retaining clips.

NOTE

Top clamp plate must not be fastened securely until stator assembly has been expanded to required set dimension.

- (9) Using PWA 70394 hydraulic cart or Enerpac pump filled with hydraulic oil, attach quick disconnect fitting from cart or pump to flare fitting(6).
- (10) Open valve on cart or pump and handle on PWA 71263 machining fixture to pressurize.



Exceeding pressure limit may cause damage to stator assembly and/or machining fixture.

NOTE

PWA 71263 machining fixture internal clamp sliders will cause a chattering noise as they are positioned.

- (11) Activate hydraulic cart or pump to pressurize machining fixture to 2,000 psig (maximum limit of 2,200 psig) while observing detail pressure gage reading on fixture. Upon reaching 2,000 psig, move fixture handle to closed position, relieve cart or pump hydraulic pressure, and disconnect from fixture. Stator assembly has been expanded to required set dimension for machining.
- (12) Tighten hand knobs(3 and 5) to secure top clamp plate(2).



Failure to ensure turning tool will not contact PWA 71263 machining fixture pressure gage when machining bottom snap diameter may cause damage to tooling.

- u. Finish machine silicone rubber to dimensions (3, 4, and 6, figure 2).

NOTE

Forward air sealing ring dimensions are measured using PWA 71266 gage and PWA 71267 master. Rear air sealing ring dimensions are measured using PWA 71264 gage and PWA 71265 master.

- (1) Verify forward and rear air sealing ring dimensions (3 and 4, figure 2).
 - (a) Place PWA 71265 master or PWA 71267 master on stable surface.
 - (b) Insert PWA 71264 gage or PWA 71266 gage into master with gage ball contacts positioned against master anvils.
 - (c) While holding gage end opposite of indicator against master anvil, sweep indicator end of gage back and forth with arc-like motion until highest reading is observed on indicator dial face. Set indicator to zero at this highest reading.
 - (d) Place gage into stator assembly positioning gage rest legs on PWA 71263 fixture gaging pads.

- (e) Hold gage end opposite of indicator against rubber and sweep indicator end back and forth with arc-like motion observing reading on indicator dial face. Silicone rubber machined dimension on indicator shall read zero within specified tolerance.

- v. Remove stator assembly from PWA 71263 machining fixture.
 - (1) Loosen, but do not remove hand knobs(3 and 5).
 - (2) Attach hydraulic cart or pump quick disconnect fitting to flare fitting(6) on fixture.
 - (3) Open cart or pump valve and move fixture handle to open position to relieve pressure in fixture, loosening internal clamp sliders of fixture. When pressure gage reads zero, close fixture handle and disconnect cart or pump from fixture.
 - (4) Remove hand knobs(3), loosen hand knobs(5), and position swing clamps outboard away from top clamp plate(2).
 - (5) Using hoist, remove top clamp plate from stator assembly and fixture.



Failure to use care during stator assembly removal from PWA 71263 machining fixture base may result in damage to stator vanes.

NOTE

Stator assembly may not release easily from machining fixture base plate, requiring use of wedge type tool (screw driver) to pry it off.

- (6) Remove stator assembly from machining fixture base plate using care as base plate posts pass between stator vanes. If stator assembly does not easily release from base plate, free it from base plate using a wedge type tool (screw driver) in the pry slots located around the stator outer snap diameter.

4. SECOND STAGE COMPRESSOR STATOR ASSEMBLY - AIR SEALING RING SILICONE RUBBER REPLACEMENT.

(See Figures 5 through 8.)



Failure to exercise care when removing rubber may result in damage to parent material and to retaining pins within the rubber.

NOTE

Waterjet stripping of PWA 407 rubber is a source qualified procedure. Refer to T.O.2J-F100-53-1, WP 602 00 for approved procedure number and for additional qualified sources.

- a. Remove existing air sealing ring rubber by conventional methods per T.O.2J-F100-53-1, WP 100 00, or by water stripping as follows:

- (1) Install PWA 71280 fixture on waterjet machine work table.

- (a) Place fixture onto outriggers of waterjet machine work table with fixture base positioned with alignment marks located on sides of outrigger arms.



Failure to secure clamps to inside diameter of fixture may cause interference with stator assembly.

- (b) Secure fixture to work table with clamps on inside diameter of fixture.
- (2) Install inside mask detail of PWA 71595 mask into inner cavity of air sealing ring.
 - (a) Place stator assembly on clean work table, rear side up.

NOTE

Inside mask detail of PWA 71595 mask consists of three collapsible ring segments. Ring segment heights are manually adjusted using cam knobs to seal air sealing ring inner cavity.

- (b) Loosen inside mask hand lock knobs on ring segments and collapse them to minimum height using hand cam knobs.
 - (c) Install inside mask ring segments into air sealing ring cavity with angled surface of ring segments corresponding to cavity angle and bottom of ring segments against air sealing flange. Mask segment with two angled ends is installed last.

- (d) Rotate hand cam knobs to raise ring segments firmly against opposite air sealing ring flange. Tighten hand lock knobs to secure.
- (3) Install stator assembly into PWA 71280 fixture.

NOTE

PWA 71280 fixture arms are marked on their sides to identify adjacent snap diameter ridges on surface of arms which correspond with appropriate outer snap diameter of stator assembly to be installed.

- (a) Place stator assembly onto fixture arms positioning the outer snap diameter into corresponding fixture snap diameter ridge. Rotate part slightly to assure proper seating. Part should be centered in fixture if properly positioned.

NOTE

PWA 71595 mask contains two different cover plates. Cover plate marked DET#1 is used if stator assembly forward diameter is facing upward. Cover plate marked DET#2 is used if rear diameter is facing upward.

- (b) Place appropriate PWA 71595 mask cover plate, rubber pad towards part, onto stator assembly aligning three legs of plate with PWA 71280 fixture clamps.
- (c) Rotate three PWA 71280 fixture clamp plates over mask cover plate and stator assembly and tighten clamps to secure.

- (4) Waterjet strip rubber from air sealing ring using approved process. Refer to T.O.2J-F100-53-1, WP 602 00.
- (5) Loosen PWA 71280 fixture clamps, remove PWA 71595 mask cover plate, and remove stator assembly from fixture. Do not remove inside mask detail of PWA 71595 mask from stator assembly.
- (6) Invert stator assembly and repeat installation procedure into PWA 71280 fixture using other PWA 71595 mask cover plate.
- (7) Waterjet strip rubber from air sealing ring using approved process. Refer to T.O.2J-F100-53-1, WP 602 00.
- (8) Remove stator assembly from fixture.
- (9) Remove tooling.
- b. Visually inspect air sealing ring to verify complete removal of PWA 407 rubber.
- c. Fluorescent penetrant inspect. No cracks allowed. Refer to T.O.2-1-111, SPOP 62.
- d. Inspect retaining pins for looseness or damage. Replace loose or damaged retaining pins per paragraph 6.
- e. Mask air sealing ring prior to dry abrasive blast using lead foil tape (PMC 4138) or PWA 71609 mask and PWA 71594 mask. (See figure 5.)
- (1) Install PWA 71609 mask as follows:
 - (a) Place mask on table with hand knobs up.
 - (b) Loosen and remove six hand knobs and remove mask cover.

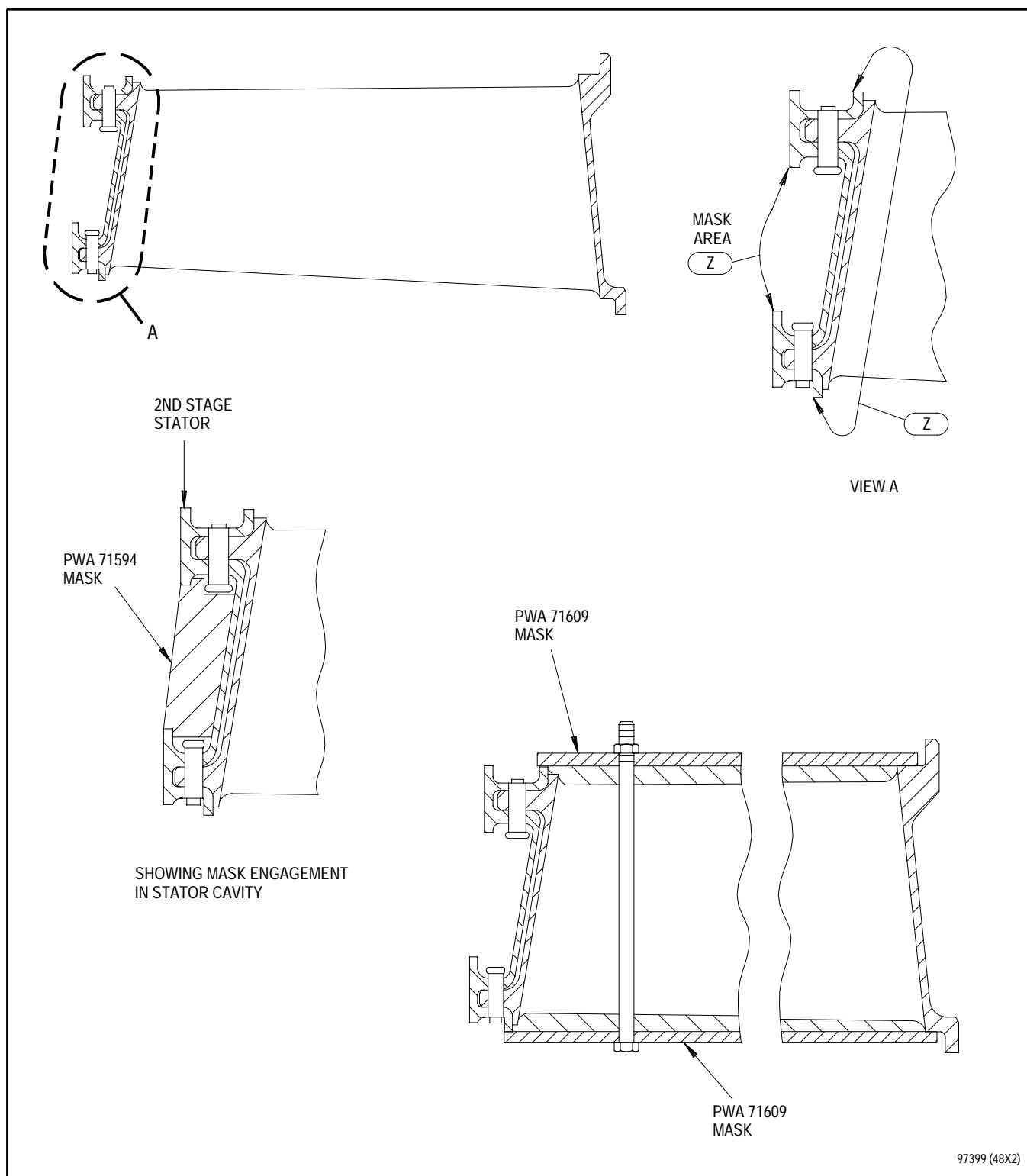


Figure 5. Second Stage Compressor Stator Assembly - Masking Locations for Grit Blast

- (c) Wipe snap diameters of mask base and cover using clean rag.



Failure to use care during installation of stator assembly onto PWA 71609 mask base may cause damage to stator vanes.

- (d) Position stator assembly smallest (forward) inside diameter down, and slowly lower onto mask base using care as mask studs pass between stator vanes. Seat stator assembly into snap diameter of mask base.

- (e) Position alignment notch on outside diameter of mask cover with alignment notch on mask base and lower cover onto stator assembly engaging rear snap diameter of stator. Install and tighten six hand knobs to secure.

- (2) Insert PWA 71594 mask into inner cavity of stator assembly air sealing ring by pushing into cavity until stepped snap diameters of mask are locked under air sealing ring flanges.



Failure to regulate pressure during dry abrasive blast may result in air sealing ring distortion.

- f. Dry abrasive blast air sealing ring flanges (1, figure 6) per PWA 83-B1 with No. 60-325 mesh nonmetallic grit. (See T.O. 2J-F100-53-1, WP 100 00.) Use 50 to 70 psig. Overspray permitted.

- g. Visually inspect to ensure complete removal of old rubber. Grit blasted surfaces shall have a uniform matte finish. Vacuum off grit residue.

- h. Remove PWA 71594 mask from air sealing ring cavity.

- i. Remove stator assembly from PWA 71609 mask.

- (1) Loosen and remove hand knobs and lift mask cover from stator assembly.



Failure to use care during removal of stator assembly from PWA 71609 mask base may result in damage to stator vanes.

- (2) Slowly lift and remove stator assembly from mask base using care as mask studs pass between stator vanes.

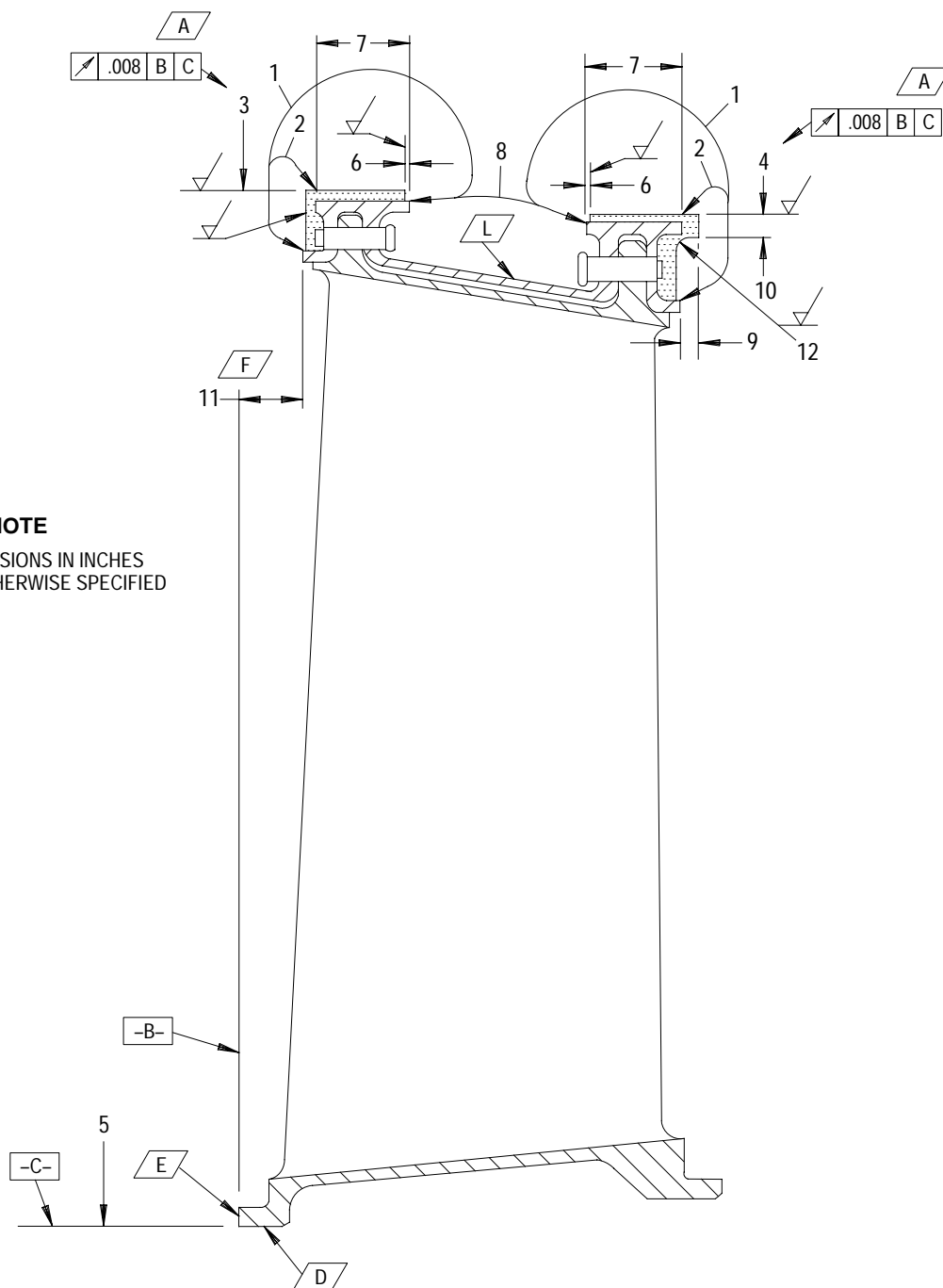


Touching repair area with bare hands after cleaning may result in degraded rubber bond.

NOTE

Isopropyl alcohol will attack residual masking tape and cause grit blast residue to stick.

- j. If lead foil tape was used for masking, remove tape prior to cleaning with isopropyl alcohol.
- k. Remove residual abrasive residue and clean area to be bonded prior to priming with isopropyl alcohol using squirt or pour type dispenser. Air dry for 15 minutes. Cleaned part shall be handled only with clean nylon gloves.



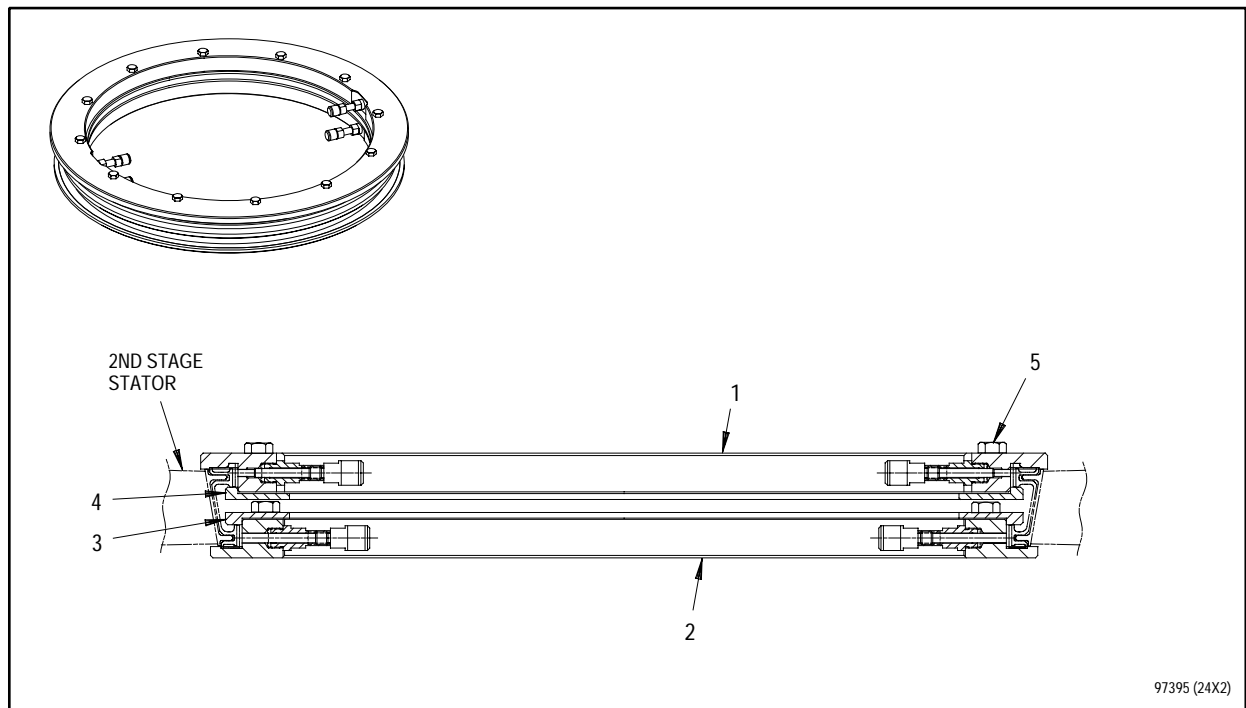
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Figure 6. Second Stage Compressor Stator Assembly - Rubber Locations and Machining Dimensions

Legend for figure 6**NOTE**

Circular runout A applies to Diameters 3 and 4 when Surface D of front feet of all vanes are radially loaded against Diameter C, Surface E of all vanes are contacting Plane B, and Part L is positioned to Dimension F.

1. Location of PWA 556 primer and PWA 407 silicone rubber
2. Void permitted in this area provided they do not expose pins or base metal. Grey discoloration of rubber due to aeration during injection process is permitted in this area only. No grey rubber allowed after final cure.
3. 19.536 to 19.544 inch average diameter. Circular runout within 0.008 inches with respect to B and C. See constraint requirements above.
4. 19.746 to 19.754 inch average diameter. Circular runout within 0.008 inches with respect to B and C. See constraint requirements above.
5. 33.030 inch diameter, reference
6. Surface of rubber to be flush to 0.020 inch below adjoining surface, two places
7. 0.560 inch minimum
8. Grit blast not allowed in this area.
9. 0.070 to 0.140 inches
10. 0.160 inch minimum
11. 0.270 to 0.290 inches
12. 0.140 inch modified radius maximum



- | | |
|--------------------------------------------|---------------------------------------------|
| 1. Rearward mold ring | 4. Rearward mold cavity seal plate assembly |
| 2. Forward mold ring | 5. Hex head cap screws |
| 3. Forward mold cavity seal plate assembly | |

Figure 7. PWA 71262 Mold Fixture Installation

NOTE

When parts are not in bond room, wrap in neutral Kraft paper.

- l. Apply primer (PWA 556) to areas to be bonded within 20 minutes of cleaning. Refer to T.O.2J-F100-53-1, WP 100 00.



Failure to apply rubber within specifies time limit may result in degraded bond.

NOTE

If rubber application cannot be accomplished within 24 hours, part must be recleaned and reprimed per preceding steps e. through l.

- m. Install stator assembly into PWA 71262 mold fixture. (See figure 7.)

NOTE

PWA 71262 mold fixture consists of two ring sets. Each set contains one full ring, segmented ring (four pieces), and 12 hex head cap screws.

- (1) Clean interior (mold cavity) surfaces of rings and ring segments with isopropyl alcohol. Allow to dry.
- (2) Apply mold release agent to interior surfaces. Refer to T.O.2J-F100-53-1, WP 100 00.
- (3) Place ring(2, figure 7) on work bench, interior surface up.
- (4) Place stator assembly, forward (smallest inside diameter) side down, onto ring(2).
- (5) Install seal plate assembly segments(3), interior surface down, onto ring(2) and secure with cap screws(5).

- (6) Place ring(1) on work bench, interior surface up.
- (7) Turn stator assembly over and place onto ring(1) aligning nozzles with nozzles on ring(2).
- (8) Install seal plate assembly segments(4), interior surfaces down, onto ring(1) and secure with cap screws(5).

NOTE

Stator assembly is positioned vertically with mold nozzles aligned vertically during injection of rubber into the mold. This allows air to be expelled from the mold as rubber fills the cavity to reduce possibility of air entrapment.

- (9) Place stator assembly in a vertical position with alignment of mold nozzles perpendicular to work bench surface.
- n. Within 2 to 24 hours after primer application, inject PWA 407 rubber into mold and cure rubber at 300°F (149°C) for 1 hour minimum after stator assembly reaches temperature in mold. Refer to T.O.2J-F100-53-1, WP 100.



Use care to not touch rubber when removing part from mold to avoid tearing rubber.

- o. After part cools, remove stator assembly from PWA 71262 mold.
- p. Inspect preliminarily cured silicone rubber per figure 6 and T.O.2J-F100-53-1, WP 100 00.
- (1) Visually inspect for voids and defects. Refer to 2, figure 6 for areas and limitations where voids or defects are allowed.

- (2) Visually inspect for discoloration. No grey rubber allowed except as shown in 2, figure 6.
- (3) Repair minor defects in silicone rubber if necessary. Refer to T.O.2J-F100-53-1, WP 100 00
- q. Place stator assembly into oven to final cure silicone rubber at 390° to 410°F (199° to 210°C) for 1 hour.
- r. Inspect silicone rubber after final cure per figure 6 and T.O.2J-F100-53-1, WP 100 00.
 - (1) Visually inspect for discoloration. No grey rubber allowed except as shown in 2, figure 6.
 - (2) Perform hardness check in accordance with ASTM D2246. Hardness shall be within 52 to 65 Durometer A. Hardness of locally repaired area shall be within 40 to 65 Durometer A.
- s. Check integrity of rubber to metal bond. Refer to T.O.2J-F100-53-1, WP 101 00.
 - (1) Parts which show no signs of bulging or air leakage are acceptable.
 - (2) Parts which show signs of bulging or air leakage must be reprocessed as applicable per preceding steps a. through s.
- t. Install stator assembly into PWA 71268 machining fixture. (See figure 8.)
 - (1) Loosen and remove six hand knobs(3, figure 8).
 - (2) Loosen six hand knobs(5) on swing clamps and swing clamps outboard.
 - (3) Install chain hoist sling hooks in swivel hoist rings(4) and remove top clamp plate(2).
 - (4) Install three 5/8-11 eye bolts in three equally spaced holes in base plate(1). Install chain hoist hooks in eye bolts and lift base plate onto center of machine work table. Lightly secure with T-nut clamps. Remove hoist and eye bolts.
 - (5) Center base plate(1) on machine work table within 0.001 inch FIR using indicator on inside track in top ring of base plate. Tighten T-nut clamps.



Failure to use care when installing stator assembly onto PWA 71268 machining fixture base plate may damage stator vanes.

NOTE

Base plate has locator (antirotation) key on inside of snap which fits in outer flange slot between any two stator vanes when stator assembly is properly seated in fixture.

- (6) Position stator assembly forward air sealing ring flange down onto base plate(1) using care as base plate posts pass between stator vanes. Align base plate locator key with outer flange slot between any two stator vanes to seat stator assembly in base plate. If not seated, tap stator vane outer flange with rawhide mallet to seat.

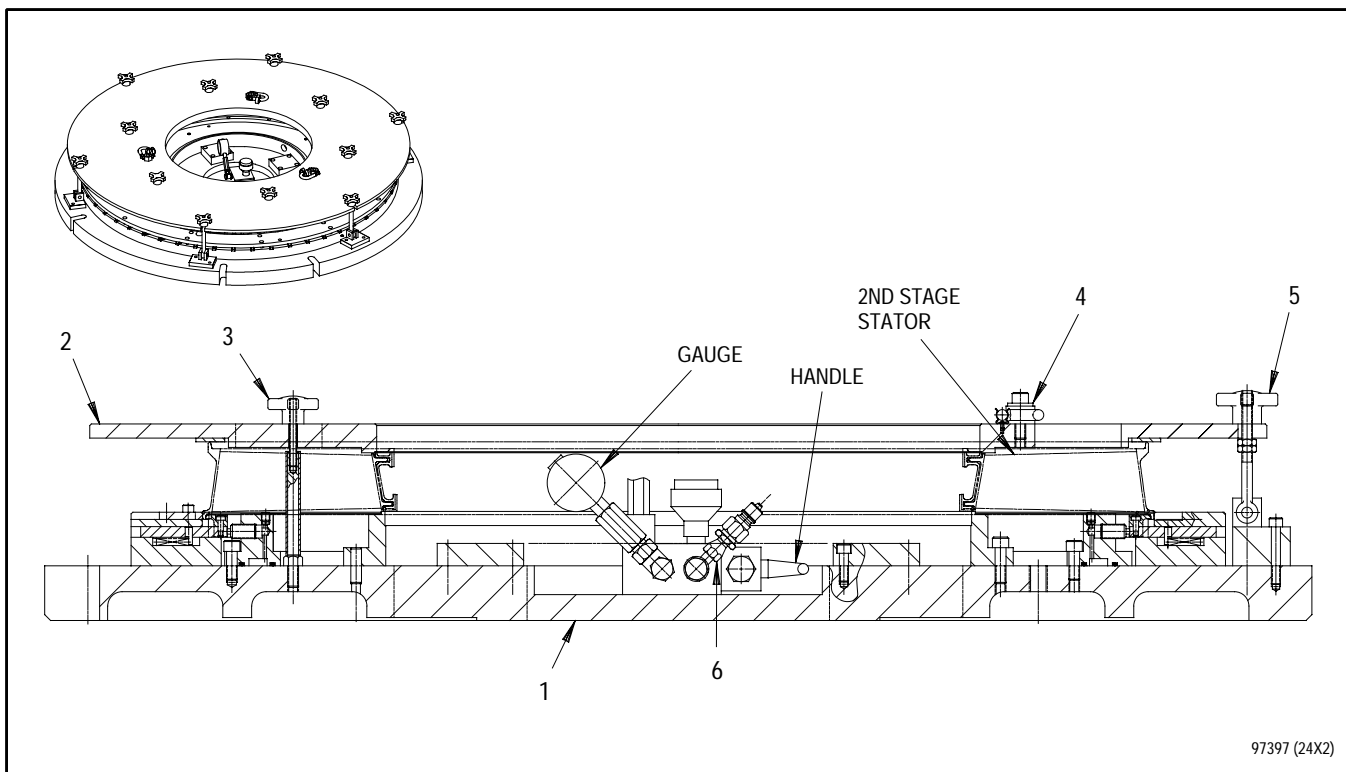
- (7) Using hoist, position top clamp plate(2) onto stator assembly and base plate(1) aligning scribed alignment marks on both top clamp plate and base plate. Thread hand knobs(3) onto base plate posts until seated, but do not tighten.
- (8) Position swing clamps inboard to engage top clamp plate(2) and turn hand knobs(5) to seat, but do not tighten. Remove hoist and secure swivel hoist rings(4) into retaining clips.

stator assembly has been expanded to required set dimension.

- (9) Using PWA 70394 hydraulic cart or Enerpac pump filled with hydraulic oil, attach quick disconnect fitting from cart or pump to flare fitting(6).
- (10) Open valve on cart or pump and handle on PWA 71268 machining fixture to pressurize.

NOTE

Top clamp plate must not be fastened securely until after



- | | |
|--------------------|-----------------------|
| 1. Base plate | 4. Swivel hoist rings |
| 2. Top clamp plate | 5. Hand knobs |
| 3. Hand knobs | 6. Flare fitting |

Figure 8. Second Stage Compressor Stator Assembly - PWA 71268 Machining Fixture



Exceeding pressure limit may cause damage to stator assembly or machining fixture.

NOTE

PWA 71268 machining fixture internal clamp sliders will cause a chattering noise as they are positioned.

- (11) Activate hydraulic cart or pump to pressurize machining fixture to 2,000 psig (maximum limit of 2,200 psig) while observing detail pressure gage reading on fixture. Upon reaching 2,000 psig, move fixture handle to closed position, relieve cart or pump hydraulic pressure, and disconnect from fixture. Stator assembly has been expanded to required set dimension for machining.
- (12) Tighten hand knobs(3 and 5) to secure top clamp plate(2).



Failure to ensure turning tool will not contact PWA 71268 machining fixture pressure gage when machining bottom snap diameter may cause damage to tooling.

- u. Finish machine silicone rubber to required dimensions (3, 4 and 6, figure 6).

NOTE

Forward air sealing ring dimensions are measured using PWA 71271 gage and PWA 71272 master. Rear air sealing ring dimensions are measured using PWA 71269 gage and PWA 71270 master.

- (1) Verify forward and rear air sealing ring dimensions (3 and 4, figure 6).
 - (a) Place PWA 71272 master or PWA 71270 master on stable surface.
 - (b) Insert PWA 71271 gage or PWA 71269 gage into master with gage ball contacts positioned against master anvils.
 - (c) While holding gage end opposite of indicator against master anvil, sweep indicator end of gage back and forth with arc-like motion until highest reading is observed on indicator dial face. Set indicator to zero at this highest reading.
 - (d) Place gage into stator assembly positioning gage rest legs on PWA 71268 machining fixture gaging pads.

- (e) Hold gage end opposite indicator against of rubber and sweep indicator end back and forth with arc-like motion observing reading on indicator dial face. Silicane rubber machined dimension on indicator shall read zero within specified tolerance.

v. Remove stator assembly from PWA 71268 machining fixture.

- (1) Loosen, but do not remove, hand knobs(3 and 5).
- (2) Attach hydraulic cart or pump quick disconnect fitting to flare fitting(6) on fixture.
- (3) Open cart or pump valve and move fixture handle to open position to relieve pressure in fixture, loosening internal clamp sliders of fixture. When pressure gage reads zero, close fixture handle and disconnect cart or pump from fixture.
- (4) Remove hand knobs(3) and loosen hand knobs(5) and position swing clamps outboard away from top clamp plate(2).
- (5) Using hoist, remove top clamp plate from stator assembly and fixture.



Failure to use care during stator assembly removal from PWA 71268 machining fixture base may result in damage to stator vanes.

NOTE

Stator assembly may not release easily from machining fixture base plate, requiring use of wedge type tool (screw driver) to pry it off.

- (6) Remove stator assembly from machining fixture base plate using care as base plate posts pass between stator vanes. If stator assembly does not easily release from base plate, free it from base plate using a wedge type tool (screw driver) in the pry slots located around the stator outer snap diameter.

5. FIRST STAGE COMPRESSOR STATOR ASSEMBLY - STATOR VANE REMOVAL AND REPLACEMENT.

(See Figures 9 through 16.)

- a. Remove silicone rubber from stator assembly air sealing ring inside diameter per paragraph 3.



Only one stator vane may be removed or replaced at a time or locating features on repair tooling for replacement stator vane will be rendered inoperable and may cause misalignment of replacement stator vanes.

- b. Remove rear retaining pins.
(See figure 9.)
 - (1) Place stator assembly on work bench, rear flange up.
 - (2) Mark retaining pins to be removed.

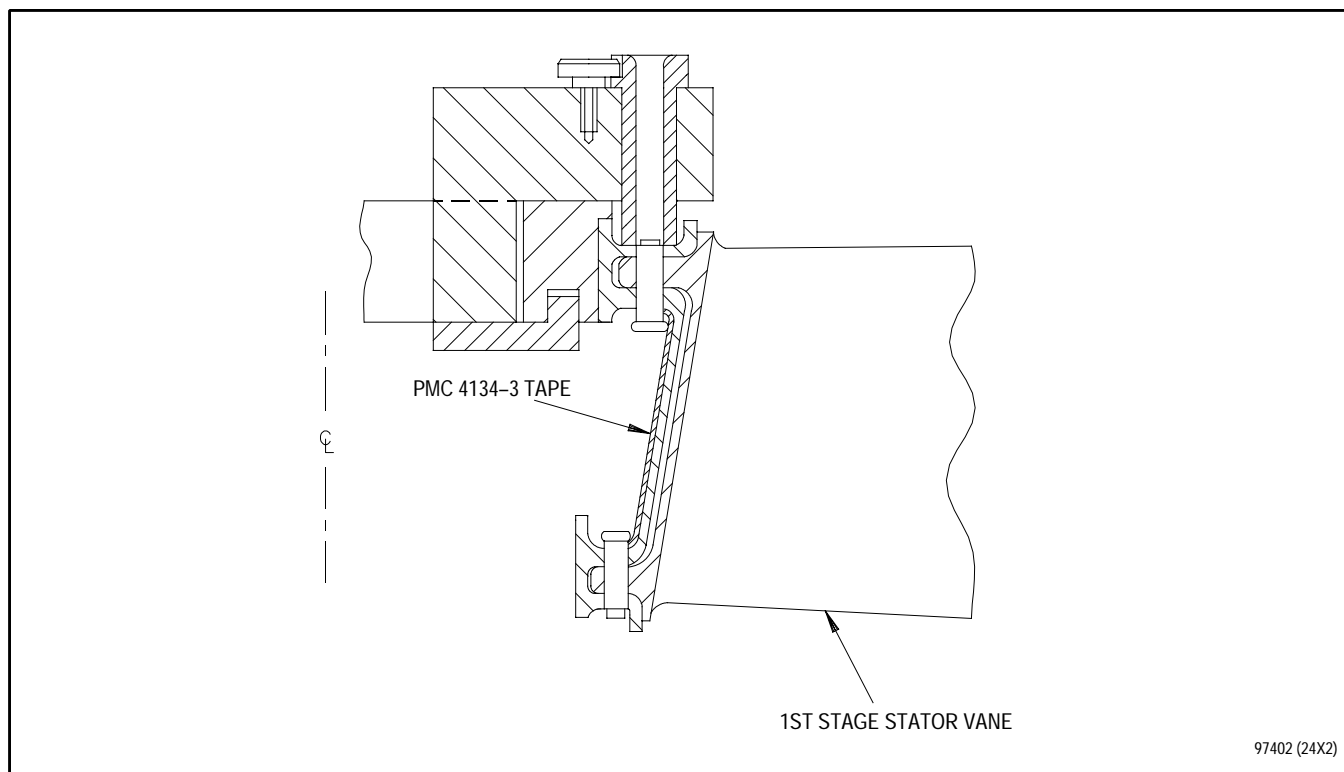


Figure 9. First Stage Compressor Stator Assembly - Rear Retaining Pin Removal Using PWA 71275 Fixture

CAUTION

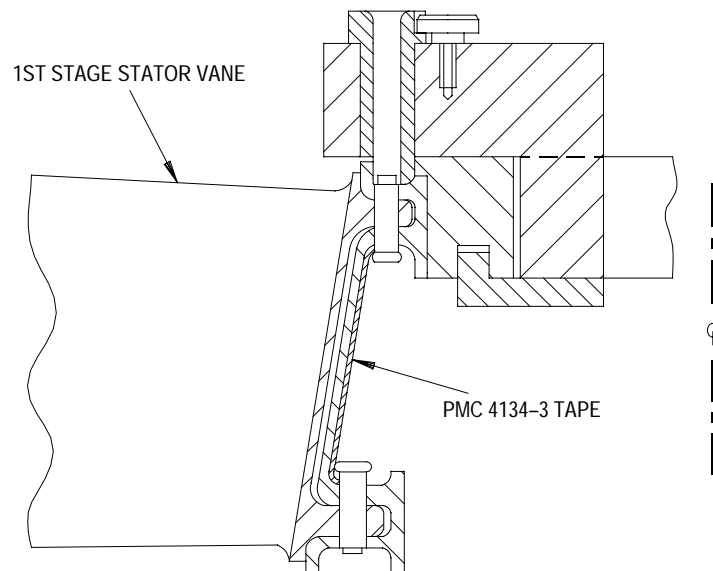
Failure to mask sealing ring cavity prior to retaining pin removal may result in damage to parent material when pin is driven out.

- (3) Locally mask inner air sealing ring cavity adjacent to retaining pins to be removed using PMC 4134-3 tape per figure 9.
- (4) Install PWA 71275 fixture on air sealing ring rear flange.
 - (a) Loosen three hand knobs on bottom of fixture and slide clamps inboard towards center of ring.
 - (b) Loosen hand knob on movable drill plate, remove bushing, and retighten hand knob.
 - (c) Insert fixture into air sealing ring until seated on flange. Slide three clamps under flange and tighten three hand knobs to secure fixture to air sealing ring.
 - (d) Loosen hand knob on movable drill plate allowing it to slide freely, and position drill plate over retaining pin to be removed.

NOTE

Flat on drill bushing flange is parallel with recessed form in bushing face providing visual aid for positioning over retaining pin.

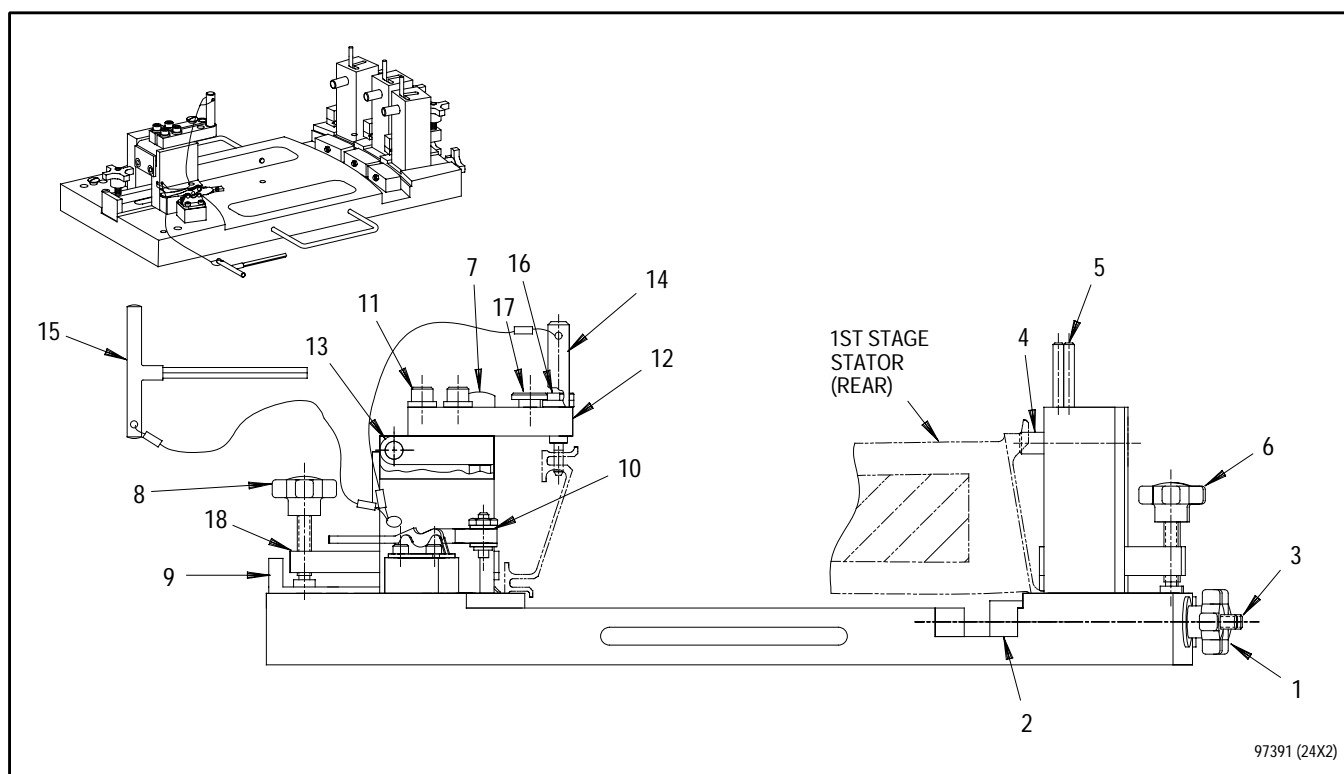
- (e) Insert drill bushing into drill plate and over retaining pin head, positioning drill plate per figure 9. Firmly hold drill plate and bushing engaged over retaining pin and tighten hand knob.
- (5) Insert number 30 (0.1285 inch) drill into drill bushing and drill retaining pin to approximately 1/8 inch deep to weaken retaining pin head.
- (6) Loosen hand knob, remove drill bushing, and slide drill plate from proximity of retaining pin.
- (7) Position 1/8 inch pin punch in drilled recess of retaining pin and strike punch to remove pin.
- (8) Repeat procedure for second retaining pin removal.
- (9) Remove tooling.
- c. Remove front retaining pins. (See figure 10.)
- (1) Reposition stator assembly on work bench, front flange up.
- (2) Remove front retaining pins with same procedure as used for rear retaining pin removal, using PWA 71277 fixture.



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Figure 10. First Stage Compressor Stator Assembly - Front Retaining Pin Removal Using PWA 71277 Fixture

- d. Remove rubber sealant from outboard end of stator vane by cutting through sealant in slots between adjacent vanes.
 - e. Remove stator vane.
 - f. Remove tape from air sealing ring cavity.
 - g. Clean residual rubber sealant from adjacent stator vane outer shrouds.
- (1) Remove remaining and extraneous rubber using bristle brush.
 - (2) Wipe clean with lint free cloth dampened with isopropyl alcohol. Air dry for 10 minutes.
 - (3) Visually inspect to verify that no extraneous or loose rubber remains in repair area.



- | | |
|-----------------------|------------------------|
| 1. Hand knob | 10. Toggle clamp |
| 2. Clamp block | 11. Cap screw |
| 3. Screw rod | 12. Bushing plate |
| 4. Locating pin | 13. Swing plate |
| 5. Dowel pin | 14. Locator pin |
| 6. Hand knob assembly | 15. Tee handle |
| 7. Half turn screw | 16. Drill bushing |
| 8. Hand knob assembly | 17. Bushing lock screw |
| 9. Slide | 18. Clamp assembly |

Figure 11. . Air Sealing Ring Rear Retaining Pin Hole Location - Transfer to Replacement Stator Vane Using PWA 71546 Fixture

h. Transfer air sealing ring rear stator vane retaining pin holes to replacement stator vane.
(See figure 11.)

(1) Place PWA 71546 fixture on work bench and prepare for stator assembly installation.

(a) Loosen three hand knobs(1, figure 11) and position clamps(2) inboard using rods(3).

(b) Rotate three dowel pins(5) from detents and slide three locating pins(4) outboard.

(c) Position two toggle clamps(10) to the open position.

(d) Loosen half turn screw(7) and position to allow placement of plate(13) in open position. Lift plate upwards.

(e) Loosen hand knob(8) securing slide(9) and position slide outboard.

NOTE

Stator assembly is positioned with replacement stator vane in PWA 71546 fixture center station, allowing adjacent stator vanes to locate stator assembly.

(2) Position replacement stator vane into stator assembly and install stator assembly into PWA 71546 fixture.

(a) Position stator assembly, rear flange up. Install and seat stator assembly onto PWA 71546 fixture with vanes adjacent to replacement vane straddling fixture center station, and upper slot in outboard ends of vanes placed to straddle locating pins(4).

(b) Place two locally manufactured support blocks approximately 120 degrees apart for stable support of stator assembly.

(c) Position two outer pins(5) and locating pins(4) inboard. Rotate pins(5) into detents to secure.

(d) Seat stator vanes against locating pins(4), using hand pressure in counterclockwise direction. Tighten hand knobs(1) to secure vanes in set position.

(e) Engage two toggle clamps(10) into clamping position on air sealing ring.

(f) Place plate(13) to closed position and secure with half turn screw(7).

(g) Loosen four cap screws(11) using tee handle(15), allowing free movement of two plates(12).

- (h) Set position of first plate(12) by inserting locating pin(14) through plate hole into existing hole of air sealing ring. Lightly rotate locating pin for proper seating and tighten two cap screws(11) using tee handle(15). Repeat to position second plate.
- (i) Remove two bushings(16) from storage location on fixture base and into plates(12). Secure with screws(17).



Failure to locate and secure drill stop on drill prior to drilling operation may cause damage to air sealing ring.

- (3) Locate and secure drill stop on drill with bottom face of drill stop set at 0.375 inch from drill cutting edge.
- (4) Using a standard hand drill and 0.156 inch diameter drill bit, drill two new holes through rear flange of replacement stator vane.

NOTE

Retaining pins are temporarily installed through rear flange to maintain replacement stator vane location during transfer of forward retaining pin holes.

- (5) Install two retaining pins in new holes to maintain stator vane location. Temporarily secure with masking tape.
- (6) Remove stator assembly from PWA 71546 fixture.

- i. Transfer air sealing ring forward stator vane retaining pin holes to replacement stator vane. (See figure 12.)

- (1) Place PWA 71545 fixture on work bench and prepare for stator assembly installation.

- (a) Loosen and remove three hand knobs(6) and three clamp assemblies(4), nuts(3), and washers(5) from block(2).

- (b) Loosen hand knobs(7) and slide clamps(10) outboard.

- (c) Slide clamp(11) outboard.

- (d) Loosen half turn screw(14) and position to allow placement of plate(8) in open position. Lift plate upwards.

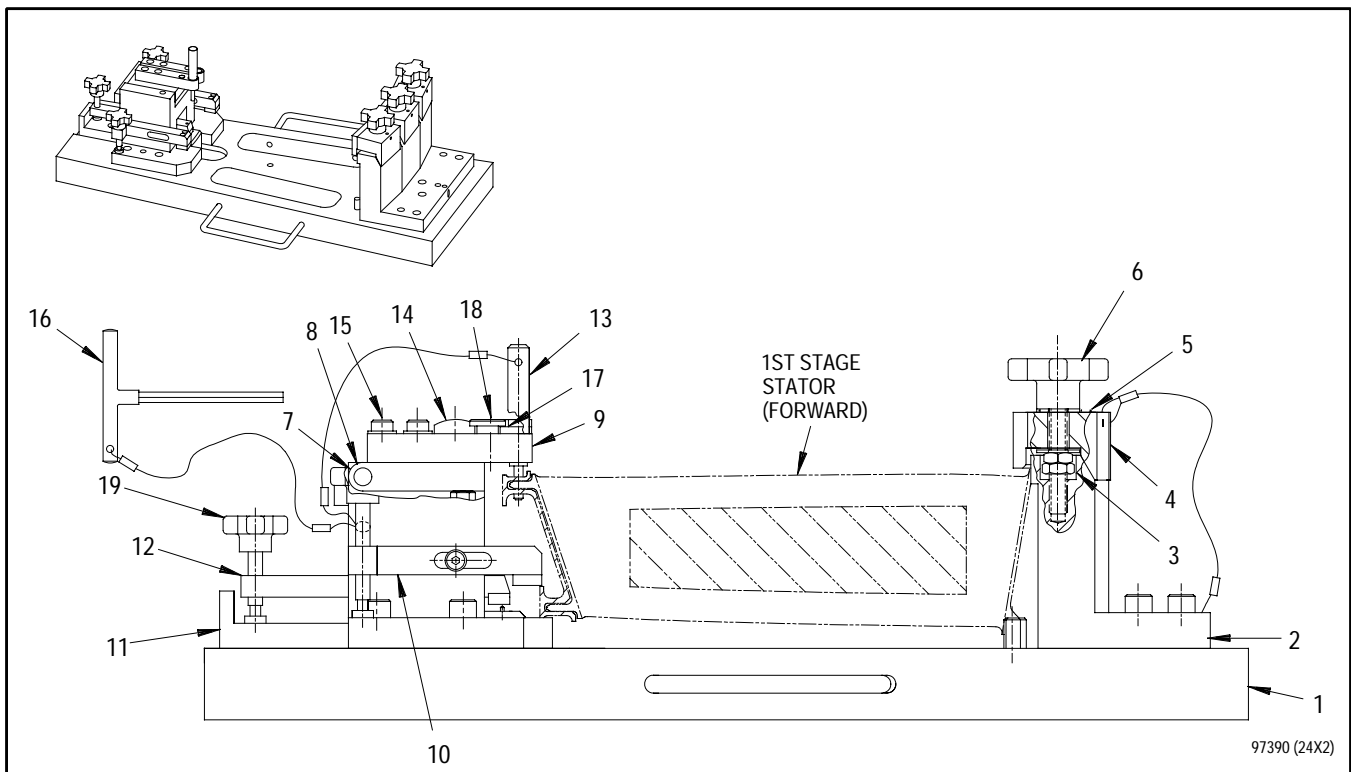
- (2) Install stator assembly into PWA 71545 fixture.

- (a) Position stator assembly, forward flange up. Install and seat stator assembly into PWA 71545 fixture with vanes adjacent to replacement vane straddling fixture center station, and lower slot in outboard ends of vanes straddling locating pins on fixture base.

- (b) Place two locally manufactured support blocks approximately 120 degrees apart for stable support of stator assembly.

- (c) Install two outer clamp assemblies(4), nuts(3), washers(5), and hand knobs(6) onto block(2).
- (d) Seat stator vanes against locating pins on fixture base, using hand pressure in a clockwise direction. Tighten hand knobs(6) to secure vanes in set position.

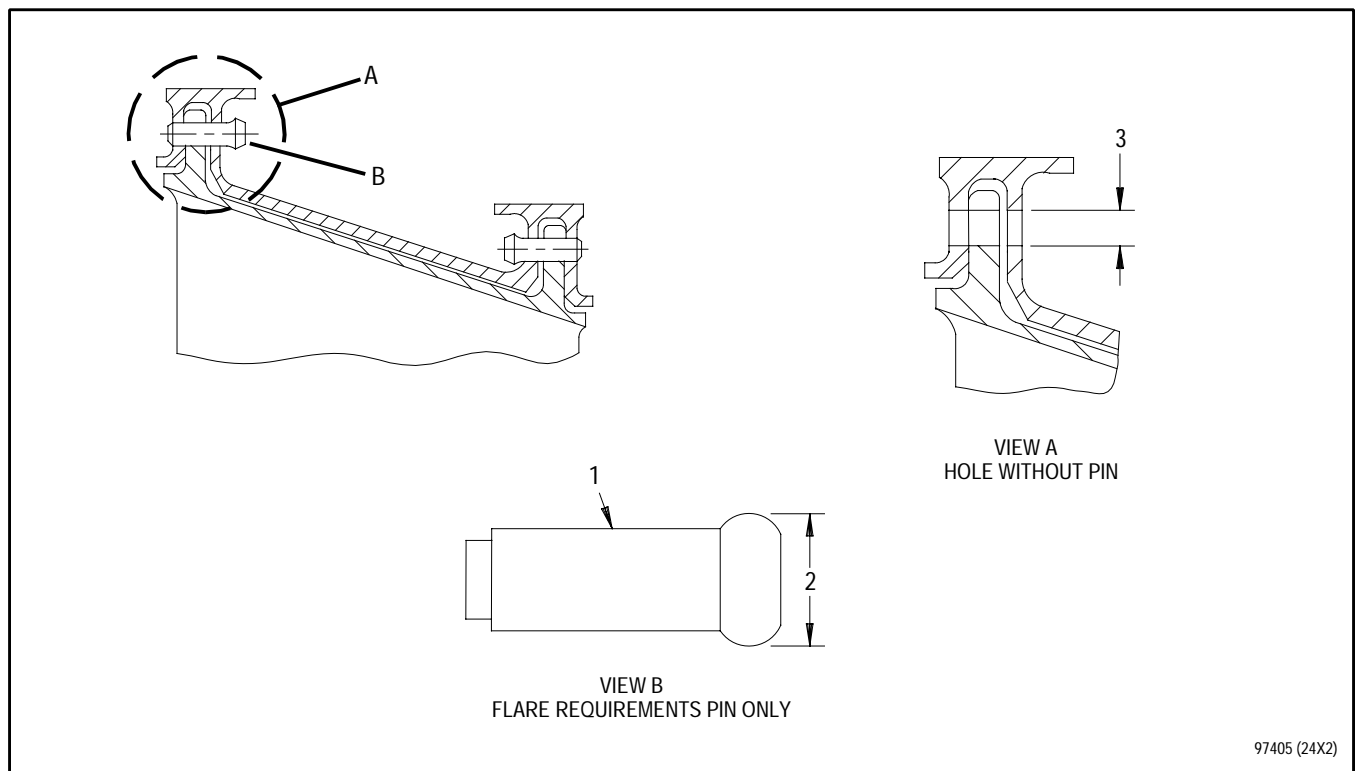
- (e) Slide clamps(10) inboard with clamp faces against air sealing ring, and tighten hand knobs(7) to secure.
- (f) Place plate(8) to closed position and secure with half turn screw(14).



- | | |
|-----------------------|------------------------|
| 1. Base | 11. Slide rest block |
| 2. Riser block | 12. Clamp assembly |
| 3. Jam nut | 13. Locating pin |
| 4. Clamp assembly | 14. Half turn screw |
| 5. Flat washer | 15. Cap screw |
| 6. Hand knob assembly | 16. Tee handle |
| 7. Knob shoe assembly | 17. Drill bushing |
| 8. Swing plate | 18. Lock screw |
| 9. Bushing plate | 19. Knob shoe assembly |
| 10. Clamp assembly | |

Figure 12. . Air Sealing Ring Forward Retaining Pin Hole Location - Transfer to Replacement Stator Vane Using PWA 71545 Fixture

- (g) Loosen four cap screws(15) using tee handle(16), allowing free movement of two plates(9).
- (h) Set position of first plate(9) by inserting locating pin(13) through plate hole into existing hole of air sealing ring. Lightly rotate locating pin for proper seating and tighten two cap screws(15) using tee handle(16). Repeat to position second plate.
- (i) Remove two bushings(17) from storage location on fixture base and into plates(9). Secure with screws(18).
- (3) Using standard hand drill and 0.156 inch drill bit, drill two new holes through forward flange of replacement stator vane.
- (4) Remove stator assembly from PWA 71545 fixture.
- j. Deburr new holes in replacement stator vane.



1. Retaining pin
2. 0.165 to 0.190 inch diameter, typical
3. 0.156 to 0.162 inch diameter hole, typical reference

Figure 13. First Stage Compressor Stator Assembly - Stator Vane Retaining Pin Positioning and Flaring Requirements

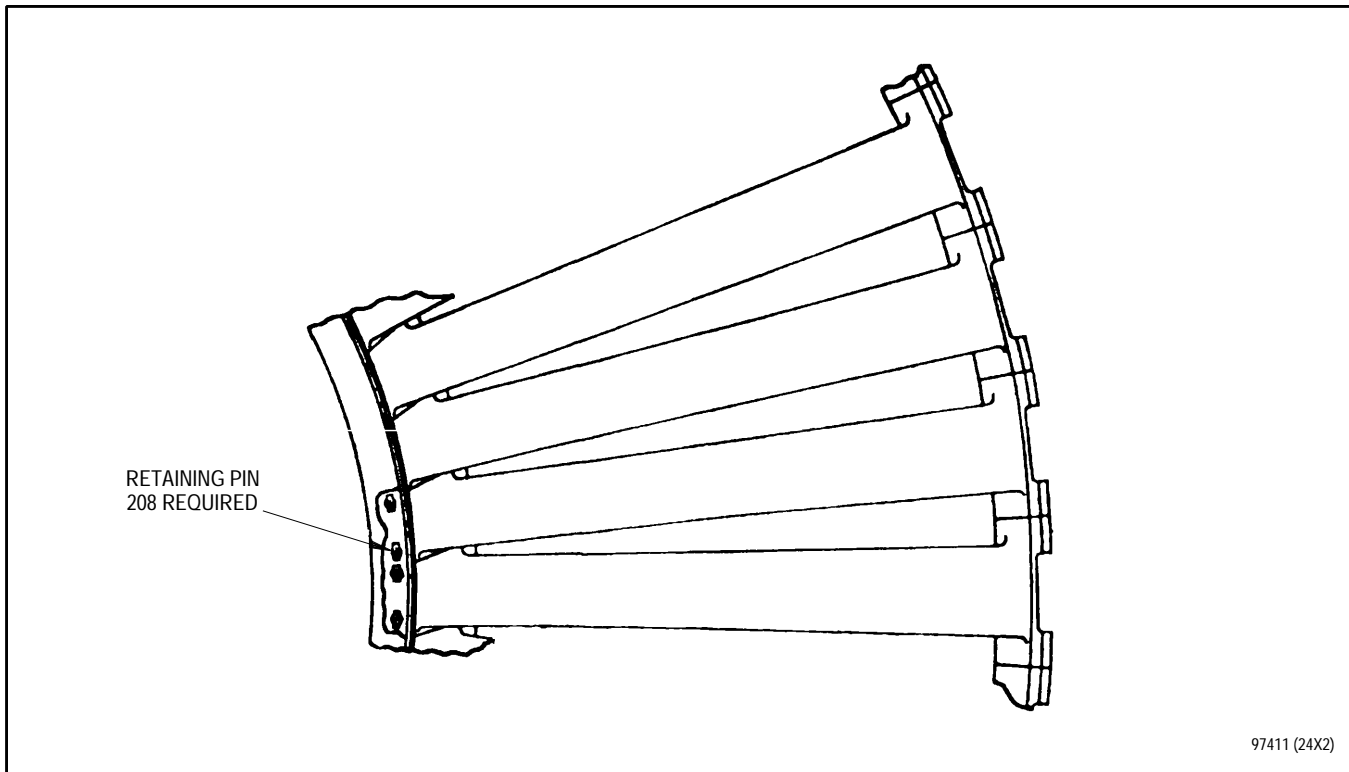


Figure 14. First Stage Compressor Stator Assembly - Stator Vane Retaining Pin Installation

- k. Install replacement stator vane into stator assembly.
 - l. Install new retaining pins into front and rear holes with preformed end properly positioned tangent to inside diameter of air sealing ring (see figures 13 and 14). Hold retaining pins in place with tape.
 - m. Flare retaining pins using PWA 71273 flaring adapter. (See figure 15.)
- (2) Remove pins(3) and position arms(4) perpendicular to riveter(2). Reinstall pins(3) to secure.
 - (3) Remove hand knobs(5) from ends of each arm(4) and rotate pinwheels(6) to position pads marked 1ST STAGE REAR at top. Reinstall hand knobs(5) to secure.

NOTE

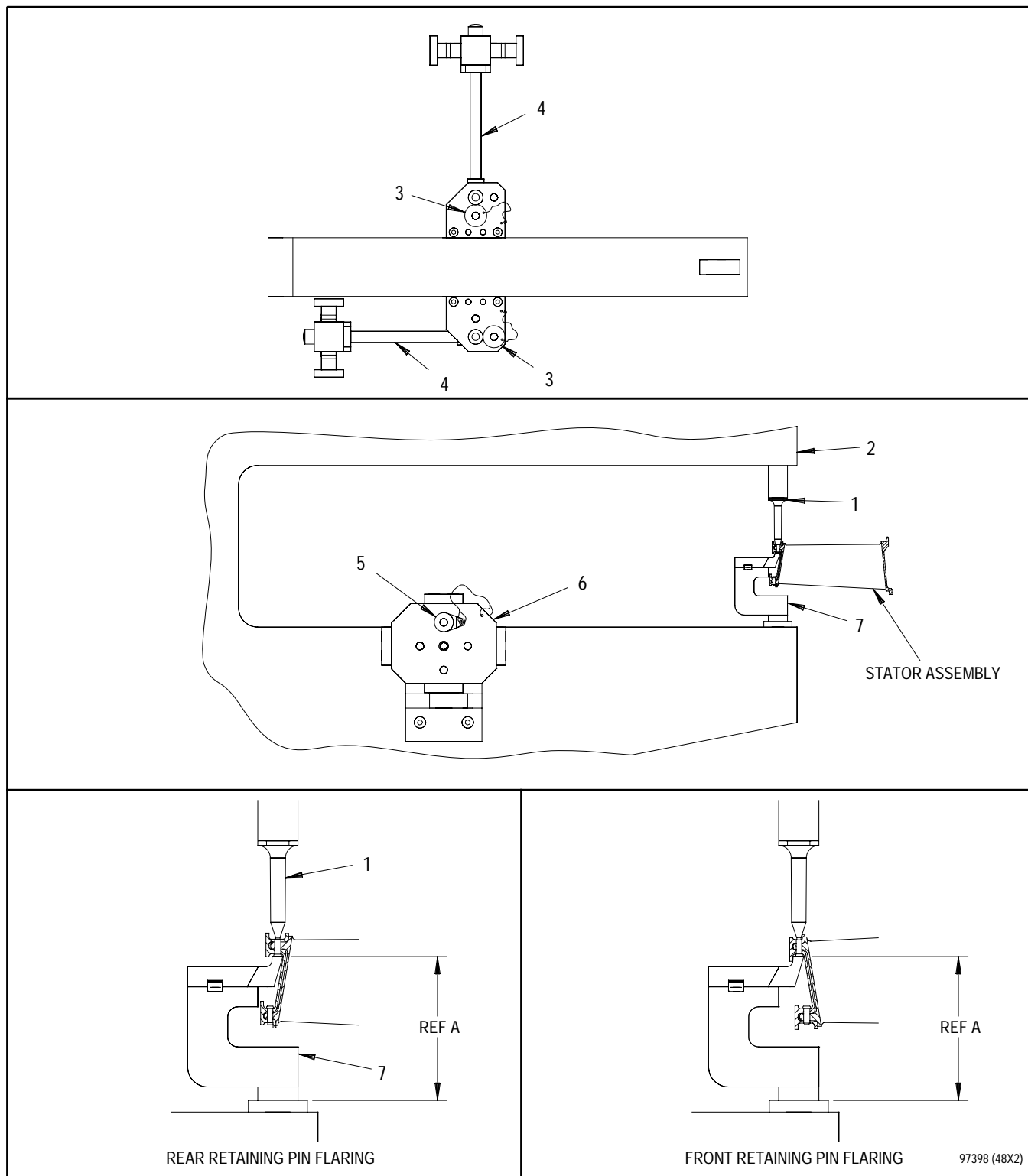
Top of PWA 71273 flaring adapter body must be preset to correct dimension to obtain 0.168 inch diameter flare on retaining pin.

- (4) Set REF A dimension to 3.160 inches for rear flange retaining pin flaring.



Failure to remove anvil from riveter prior to installing stator assembly may cause damage to stator assembly.

- (1) Remove anvil(1) from riveter(2).



**Figure 15. First Stage Compressor Stator Assembly - Retaining Pin Flaring
Using PWA 71273 Flaring Adapter**

Legend for figure 15

- | | |
|----------------------|--------------|
| 1. Anvil | 5. Hand knob |
| 2. Riveter | 6. Pinwheel |
| 3. Quick release pin | 7. Body |
| 4. Arm assembly | |

(5) Place stator assembly, rear flange up, onto PWA 71273 flaring adapter with retaining pin positioned on top of body(7) and outside diameter of stator assembly resting on pinwheels(6). Hold stator assembly with slight angle to prevent retaining pin from backing out of hole.

(6) Install anvil(1) into riveter(2).

NOTE

During flaring, stator assembly may be required to be removed and reinstalled to adjust riveter(2) pressure for obtaining proper flare dimension.

(7) Activate foot pedal to flare retaining pin.

(8) Rotate stator assembly to position second retaining pin on top of body(7) and flare retaining pin.

(9) Remove anvil(1) and remove stator assembly from PWA 71273 flaring adapter.

(10) Check retaining pins for tightness and flares, using dial vernier caliper, to verify proper flare dimension per figure 13. Correct as necessary.

(11) Remove hand knobs(5) and rotate pinwheels(6) to position pads marked 1ST STATOR FRONT at top.

(12) Set REF A dimension (figure 15) to 3.165 inches for front flange retaining pin flaring.

(13) Turn stator assembly rear flange up, and place it onto PWA 71273 flaring adapter with retaining pin positioned on top of body(7), and repeat flaring process for front retaining pins.

(14) Remove anvil(1) and remove stator assembly from PWA 71273 flaring adapter.

(15) Check retaining pins for tightness and flares, using dial vernier caliper, to verify proper flare dimension per figure 15. Correct as necessary.

n. Repeat process for additional stator vanes requiring replacement.

o. Inspect retaining pins for looseness or damage. Replace loose or damaged retaining pins.

p. Fluorescent penetrant inspect. Refer to T.O.2-1-111, SPOP 62. No cracks allowed.

q. Apply PWA 407 silicone rubber to air sealing ring flanges per paragraph 3.

r. Repair stator assembly outer diameter rubber sealant. (See figure 16.)

(1) Verify platform gaps at new and adjacent vanes are free from old rubber. Remove any extraneous rubber using bristle brush.

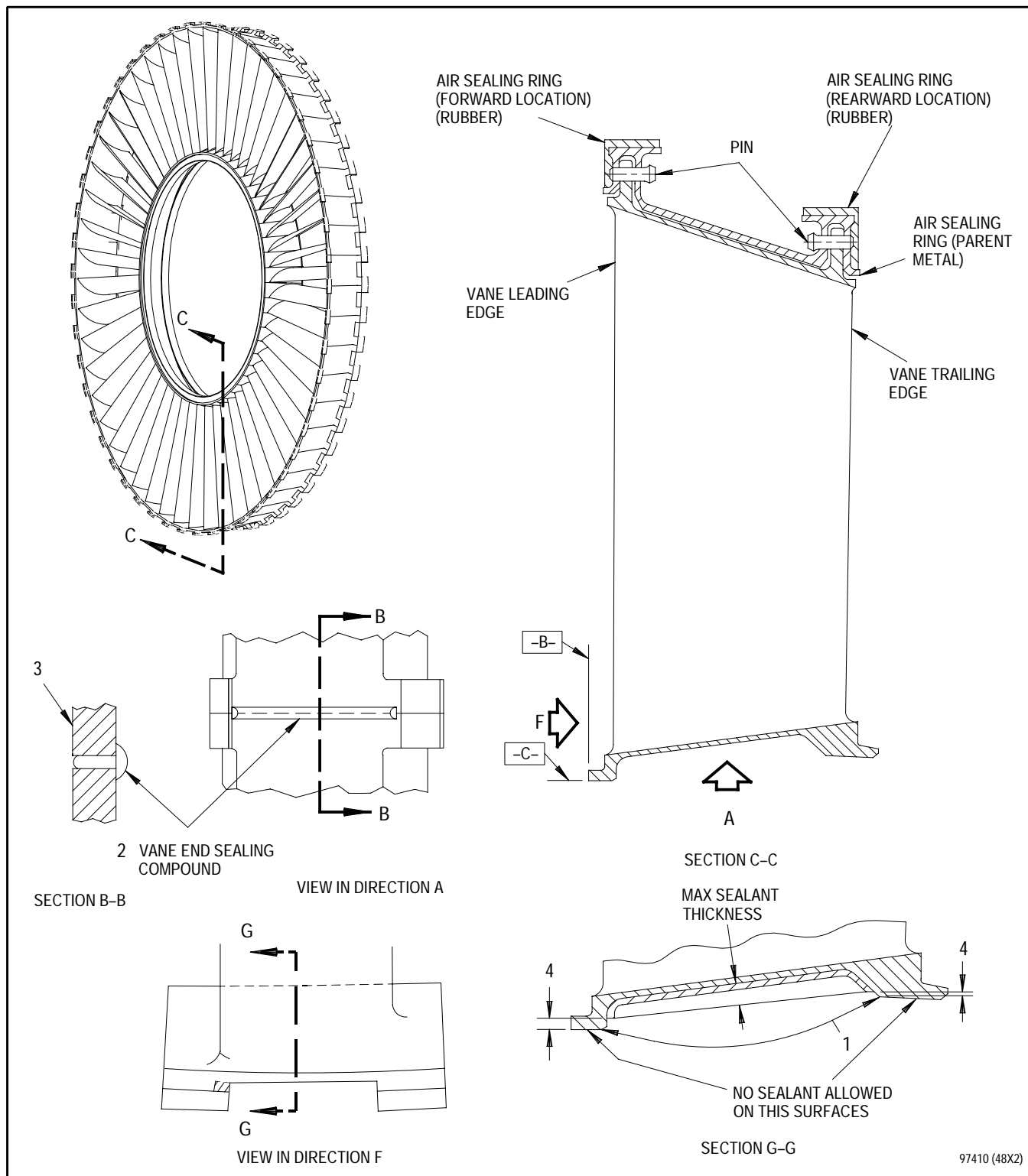


Figure 16. First Stage Compressor Stator Assembly - Outer Slot Rubber Replacement

Legend for figure 16

1. Sealant (PWA 36003)
 2. Complete coverage required as shown. Finish forming of sealant bead not required.
 3. Sealant flush or below this surface
 4. 0.000 inch (flush) to 0.100 inch from outer surface
-
- (2) Clean slots per PWA 83-B2 using lint free cloth dampened with isopropyl alcohol.
 - (3) Thoroughly dry solvent wiped surfaces at ambient temperature or in oven at 250°F (121°C). Drying time shall be sufficient to remove all traces of solvent detrimental to bonding of rubber.
 - (4) Apply PWA 36003 sealant in a bead between stator vane platform per figure 16.
 - (5) Cure sealant per PWA 615.
 - (a) Initial cure for 24 hours minimum at 50 percent relative humidity and room temperature to permit handling.

NOTE

If sealant cross section is less than 0.025 inch, full cure can be waived. Only an additional 48 hours is required after initial cure.

- (b) Full cure at 120 hours at 50 percent relative humidity and room temperature.

6. SECOND STAGE COMPRESSOR STATOR ASSEMBLY - STATOR VANE REMOVAL AND REPLACEMENT.

(See Figures 17 through 24.)

- a. Remove silicone rubber from stator assembly air sealing ring inside diameter per paragraph 4.



Only one stator vane may be removed or replaced at a time or locating features on repair tooling for replacement stator vane will be rendered inoperable and may cause misalignment of replacement stator vane.

- b. Remove rear retaining pins. (See figure 17.)
 - (1) Place stator assembly on work bench, rear flange up.
 - (2) Mark retaining pins to be removed.



Failure to mask sealing ring cavity prior to retaining pin removal may result in damage to parent material when pin is driven out.

- (3) Locally mask inner air sealing ring cavity adjacent to retaining pins to be removed using PMC 4134-3 tape per figure 17.
- (4) Install PWA 71276 fixture on air sealing ring rear flange.
 - (a) Loosen three hand knobs on bottom of fixture and slide clamps inboard towards center of ring.

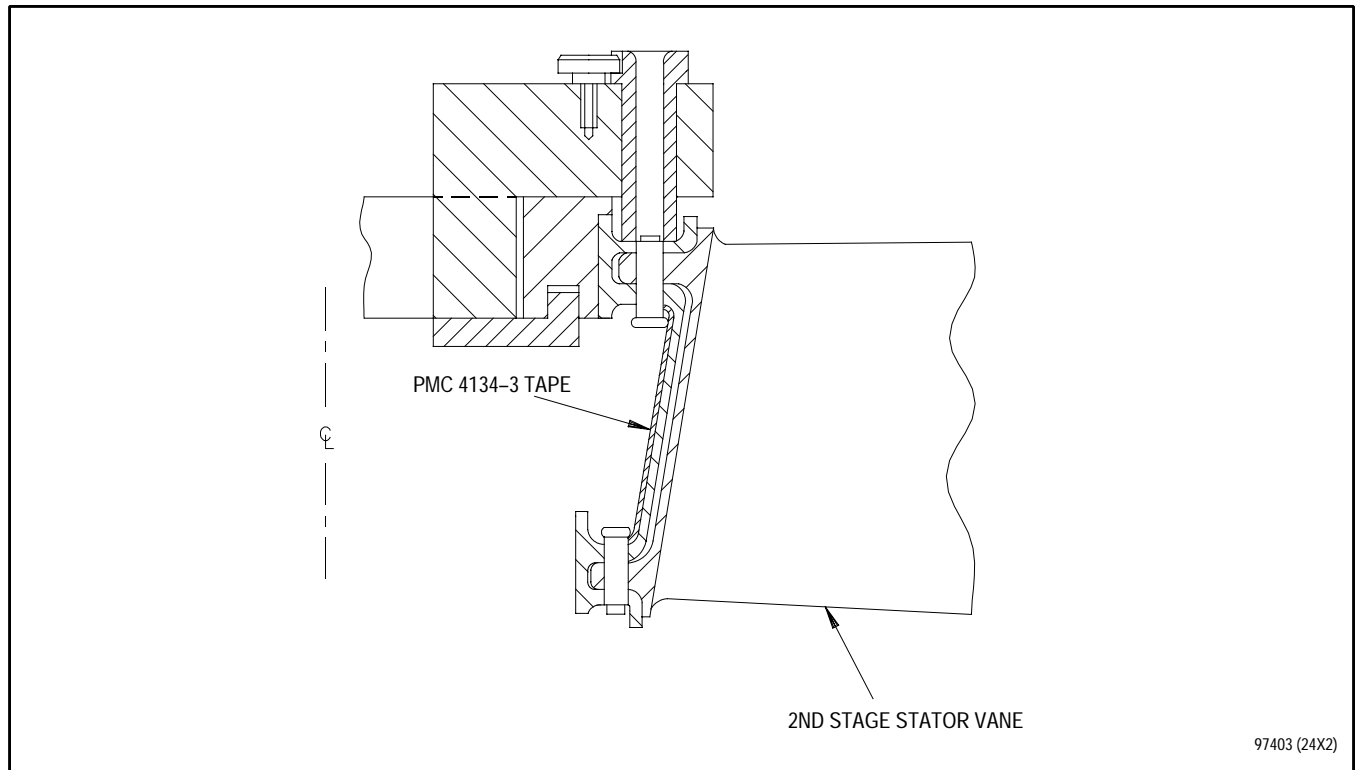


Figure 17. Second Stage Compressor Stator Assembly - Rear Retaining Pin Removal Using PWA 71276 Fixture

- (b) Loosen hand knob on movable drill plate, remove bushing, and retighten hand knob.
- (c) Insert fixture into air sealing ring until seated on flange. Slide three clamps under flange and tighten three hand knobs to secure fixture to air sealing ring.
- (d) Loosen hand knob on movable drill plate allowing it to slide freely, and position drill plate over retaining pin to be removed.

NOTE

Flat on drill bushing flange is parallel with recessed form in bushing face providing visual aid for positioning over retaining pin.

- (e) Insert drill bushing into drill plate and over retaining pin head, positioning drill plate per figure 17. Firmly hold drill plate and bushing engaged over retaining pin and tighten hand knob.
- (5) Insert number 30 (0.1285 inch) drill into drill bushing and drill retaining pin to approximately 1/8 inch deep to weaken retaining pin head.

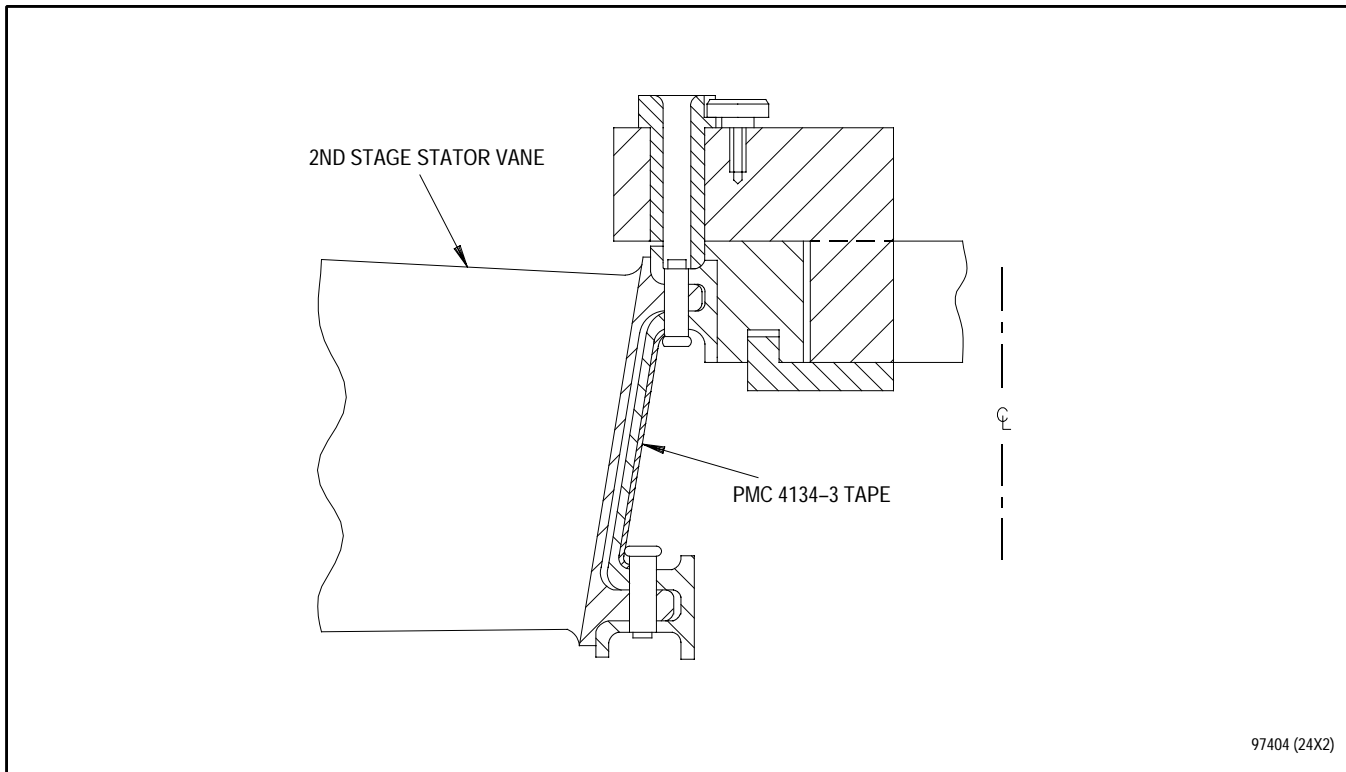
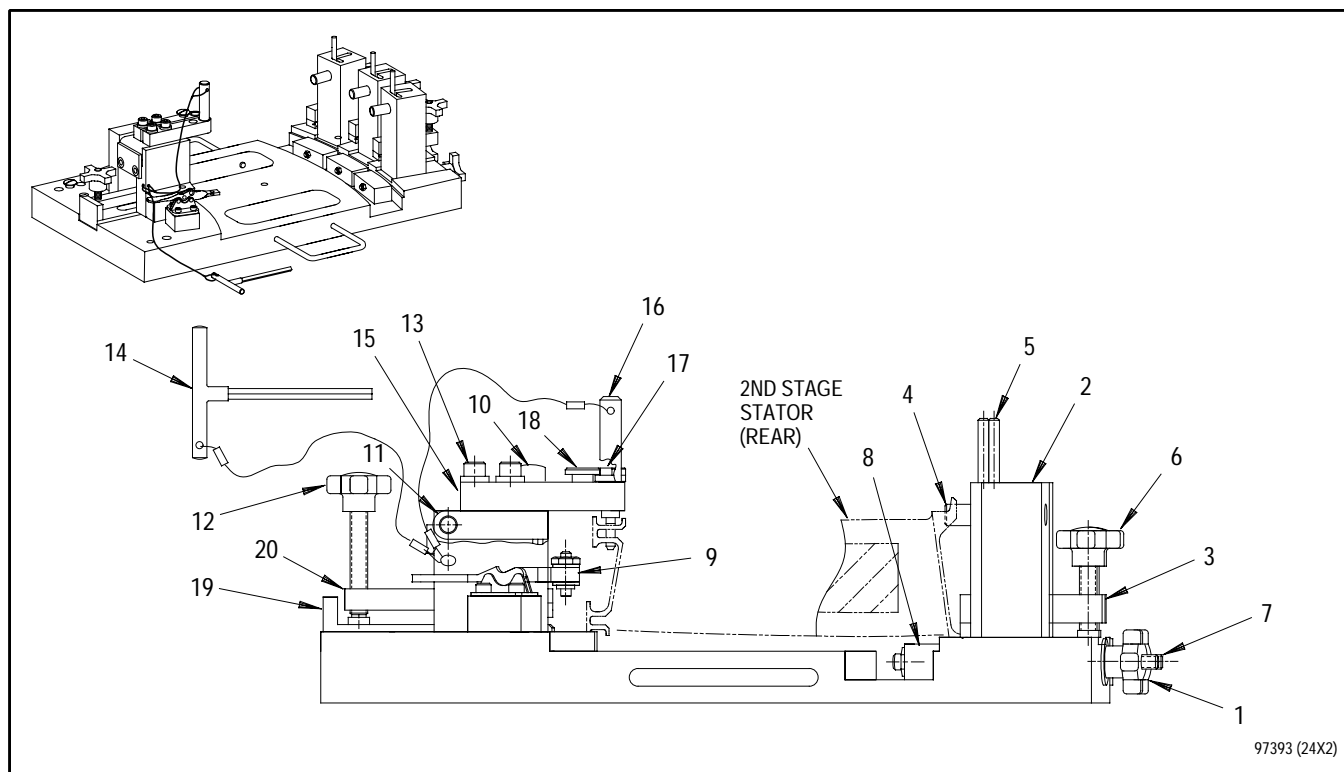


Figure 18. Second Stage Compressor Stator Assembly - Front Retaining Pin Removal Using PWA 71278 Fixture

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- (6) Loosen hand knob, remove drill bushing, and slide drill plate from proximity of retaining pin.
- (7) Position 1/8 inch pin punch in drilled recess of retaining pin and strike punch to remove pin.
- (8) Repeat procedure for second retaining pin removal.
- (9) Remove tooling.
- c. Remove front retaining pins.
(See figure 18.)
- (1) Reposition stator assembly on work bench, front flange up.
- (2) Remove front retaining pins with same procedure as used for rear retaining pin removal, using PWA 71278 fixture.
- d. Remove rubber sealant from outboard end of stator vane by cutting through sealant in slots between adjacent vanes.
- e. Remove stator vane.
- f. Remove tape from air sealing ring cavity.
- g. Clean residual rubber sealant from adjacent stator vane outer shrouds.
- (1) Remove remaining and extraneous rubber using bristle brush.
- (2) Wipe clean with lint free cloth dampened with isopropyl alcohol. Air dry for 10 minutes.
- (3) Visually inspect to verify that no extraneous or loose rubber remains in repair area.



- | | |
|-----------------------|------------------------|
| 1. Hand knob | 11. Swing plate |
| 2. Block | 12. Hand knob assembly |
| 3. Clamp assembly | 13. Cap screw |
| 4. Locating pin | 14. Tee handle |
| 5. Dowel pin | 15. Bushing plate |
| 6. Hand knob assembly | 16. Locator pin |
| 7. Screw rod | 17. Drill bushing |
| 8. Clamp block | 18. Bushing lock screw |
| 9. Toggle clamp | 19. Slide |
| 10. Half turn screw | 20. Clamp assembly |

Figure 19. Air Sealing Ring Rear Retaining Pin Hole Location - Transfer to Replacement Stator Vane Using PWA 71548 Fixture

h. Transfer air sealing ring rear stator vane retaining pin holes to replacement stator vane.
(See figure 19.)

(1) Place PWA 71548 fixture on work bench and prepare for stator assembly installation.

(a) Loosen three hand knobs(1, figure 19) and

position clamp blocks(8) inboard using rods(7).

(b) Rotate three dowel pins(5) from detents and slide three locating pins(4) outboard.

(c) Position two toggle clamps(9) to the open position.

- (d) Loosen half turn(10) screw and position to allow placement of plate(11) in open position. Lift plate upwards.
- (e) Loosen hand knob(12) securing slide(19) and position slide outboard.

NOTE

Stator assembly is positioned with replacement stator vane in PWA 71546 fixture center station, allowing adjacent stator vanes to locate stator assembly.

- (2) Position replacement stator vane into stator assembly and install stator assembly into PWA 71548 fixture.

- (a) Position stator assembly, rear flange up. Install and seat stator assembly onto PWA 71548 fixture with vanes adjacent to replacement vane straddling fixture center station, and upper slot in outboard ends of vanes placed to straddle locating pins(4).
- (b) Place two locally manufactured support blocks approximately 120 degrees apart for stable support of stator assembly.
- (c) Position two outer pins(5) and locating pins(4) inboard. Rotate pins(5) into detents to secure.

- (d) Seat stator vanes against locating pins(4), using hand pressure in counterclockwise direction. Tighten hand knobs(1) to secure vanes in set position.
- (e) Tighten clamps(3) with hand knobs(6).
- (f) Engage two toggle clamps(9) into clamping position on air sealing ring.
- (g) Place plate(11) to closed position and secure with half turn screw(10).
- (h) Loosen four cap screws(13) using tee handle(14), allowing free movement of two plates(15).
- (i) Set position of first plate(15) by inserting locator pin(16) through plate hole into existing hole of air sealing ring. Lightly rotate locating pin for proper seating and tighten two cap screws(13) using tee handle(14). Repeat to position second plate.
- (j) Remove two bushings(17) from storage location on fixture base and into plates(15). Secure with screws(18).



Failure to locate and secure drill stop on drill prior to drilling operation may cause damage to air sealing ring.

- (3) Locate and secure drill stop on drill with bottom face of drill stop set at 0.500 inch from drill cutting edge.
- (4) Using a standard hand drill and 0.156 inch diameter drill bit, drill two new holes through rear flange of replacement stator vane.

NOTE

Retaining pins are temporarily installed through rear flange to maintain replacement stator vane location during transfer of forward retaining pin holes.

- (5) Install two retaining pins in new holes to maintain stator vane location. Temporarily secure with masking tape.
 - (6) Remove stator assembly from PWA 71548 fixture.
- i. Transfer air sealing ring forward stator vane retaining pin holes to replacement stator vane. (See figure 20.)
- (1) Place PWA 71547 fixture on work bench and prepare for stator assembly installation.
 - (a) Loosen and remove three hand knobs(6, figure 20) and three clamps assemblies(4), nuts(3), and washers(5) from block(2).
 - (b) Loosen hand knobs(17) and slide clamps(10) outboard.
 - (c) Slide block(11) outboard.
 - (d) Loosen half turn screw(7) and position to allow placement of plate(8) in open position. Lift plate upwards.
 - (2) Install stator assembly into PWA 71547 fixture.
 - (a) Position stator assembly, forward flange up. Install and seat stator assembly into PWA 71547 fixture with vanes adjacent to replacement vane straddling fixture center station, and lower slot in outboard ends of vanes straddling locating pins on fixture base.
 - (b) Place two locally manufactured support blocks approximately 120 degrees apart for stable support of stator assembly.
 - (c) Install two outer clamp assemblies(4), nuts(3), washers(5), and hand knobs(6) onto block(2).
 - (d) Seat stator vanes against locating pins on fixture base, using hand pressure in a clockwise direction. Tighten hand knobs(6) to secure vanes in set position.
 - (e) Slide clamps(10) inboard with clamp faces against air sealing ring, and tighten knob shoe assemblies(17) to secure.

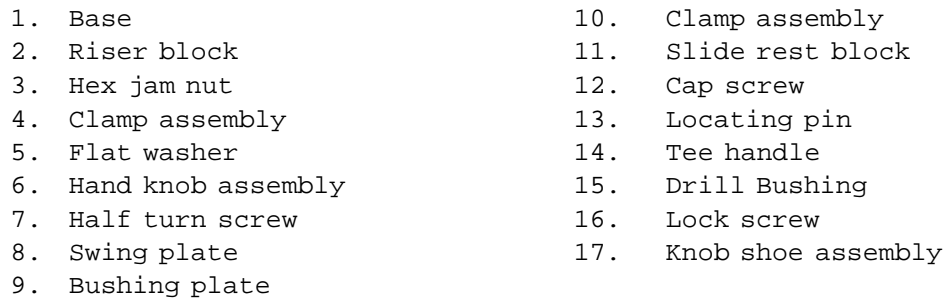
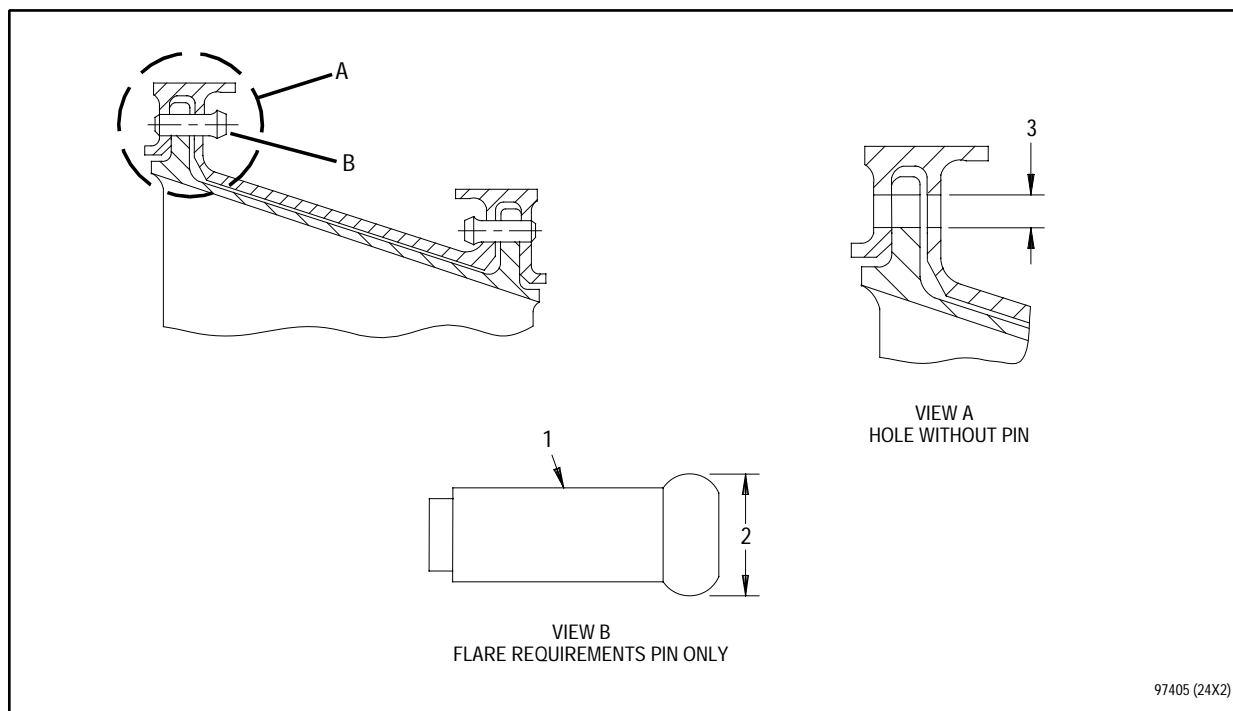


Figure 20. Air Sealing Ring Front Retaining Pin Hole Location - Transfer to Replacement Stator Vane Using PWA 71547 Fixture

- (f) Place plate(8) to closed position and secure with half turn screw(7).
- (g) Loosen four cap screws(12) using tee handle(14), allowing free movement of two plates(9).
- (h) Set position of first plate(9) by inserting locating pin(13) through plate hole into existing hole of air sealing ring. Lightly rotate locating pin for proper seating and tighten two cap screws(12) using tee handle(14). Repeat to position second plate.



1. Retaining pin
2. 0.165 to 0.190 inch diameter, typical
3. 0.156 to 0.162 inch diameter hole, typical reference

Figure 21. Second Stage Compressor Stator Assembly - Stator Vane Retaining Pin Positioning and Flaring Requirements

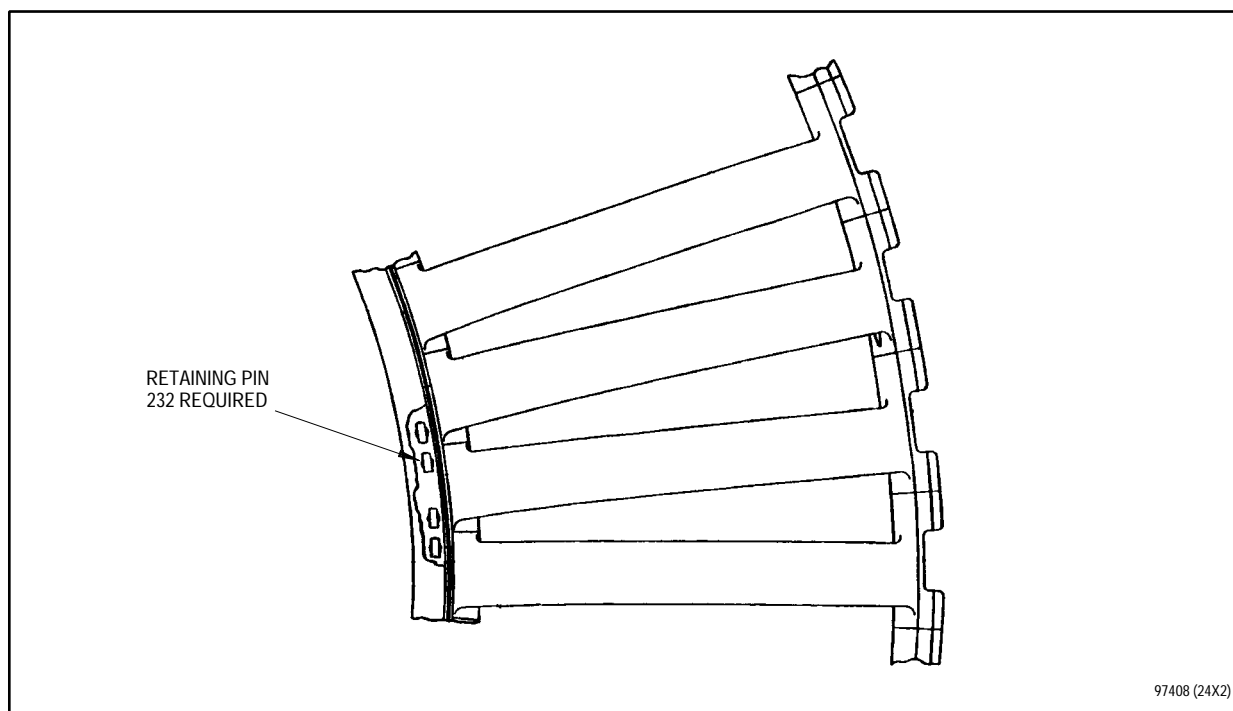


Figure 22. Second Stage Compressor Stator Assembly - Stator Vane Retaining Pin Position

- (i) Remove two bushings(15) from storage location on fixture base and into plates(8). Secure with screws(16).
- (3) Using standard hand drill and 0.156 inch drill bit, drill two new holes through forward flange of replacement stator vane.
- (4) Remove stator assembly from PWA 71547 fixture.
- j. Deburr new holes in replacement stator vane.
- k. Install replacement stator vane into stator assembly.
- l. Install new retaining pins into front and rear holes with preformed end properly positioned tangent to inside diameter of air sealing ring (see figures 21 and 22). Hold retaining pins in place with tape.
- m. Flare retaining pins using PWA 71273 flaring adapter. (See figure 23.)



Failure to remove anvil from riveter prior to installing stator assembly may cause damage to stator assembly.

- (1) Remove anvil(1, figure 23) from riveter(2).
- (2) Remove pins(3) and position arms(4) perpendicular to riveter(2). Reinstall pins(3) to secure.

- (3) Remove hand knobs(5) from ends of each arm(4) and rotate pinwheels(6) to position pads marked 2ND STAGE REAR at top. Reinstall hand knobs(5) to secure.

NOTE

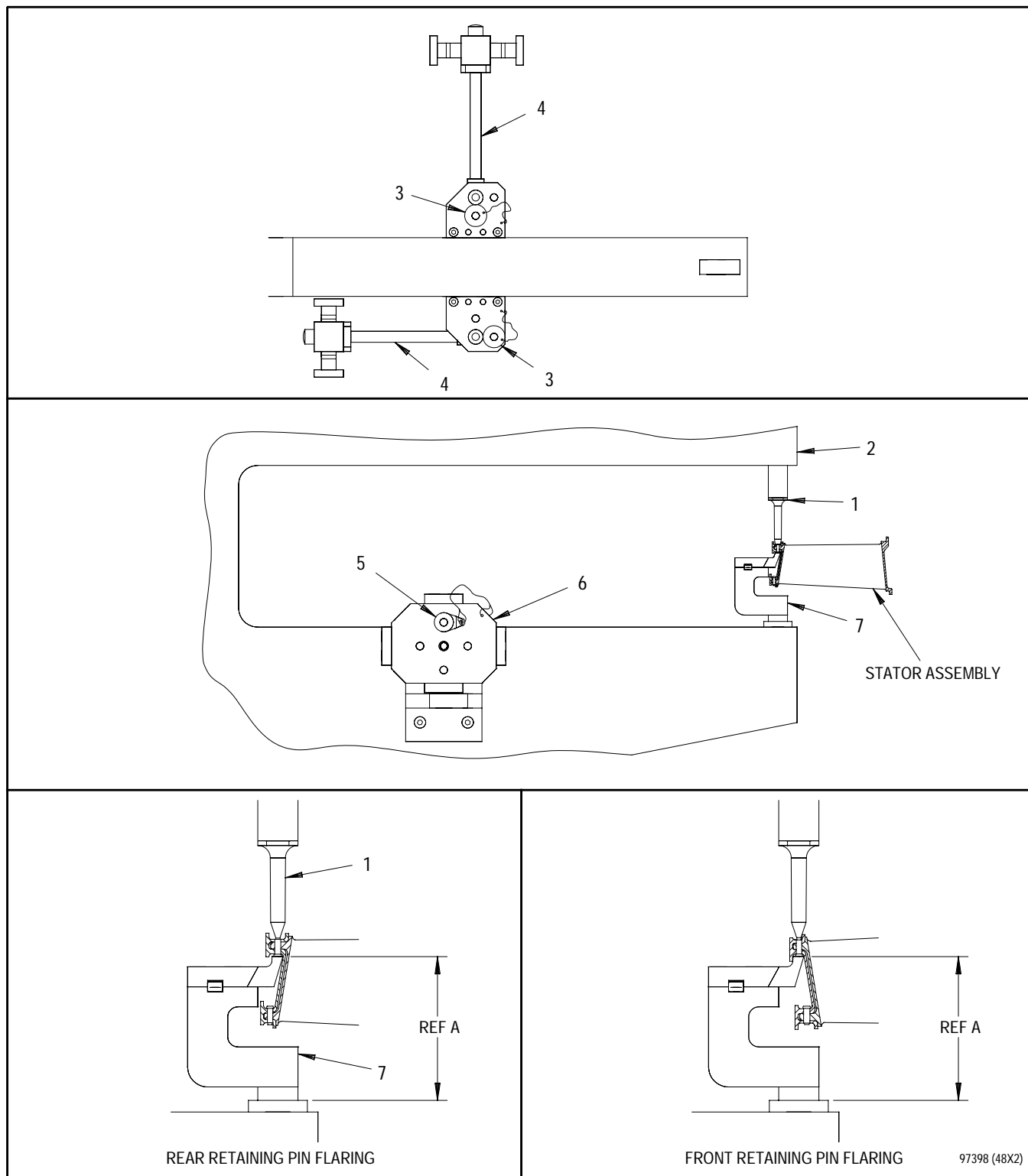
Top of PWA 71273 flaring adapter body must be preset to correct dimension to obtain 0.168 inch diameter flare on retaining pin.

- (4) Set REF A dimension to 3.167 inches for rear flange retaining pin flaring.
- (5) Place stator assembly, rear flange up, onto PWA 71273 flaring adapter with retaining pin positioned on top of body(7) and outside diameter of stator assembly resting on pinwheels(6). Hold stator assembly with slight angle to prevent retaining pin from backing out of hole.
- (6) Install anvil(1) into riveter(2).

NOTE

During flaring, stator assembly may be required to be removed and reinstalled to adjust riveter(2) pressure for obtaining proper flare dimension.

- (7) Activate foot pedal to flare retain retaining pin.
- (8) Rotate stator assembly to position second retaining pin on top of body(7) and flare retaining pin.
- (9) Remove anvil(1) and remove stator assembly from PWA 71273 flaring adapter.



Legend for figure 23

- | | |
|----------------------|--------------|
| 1. Anvil | 5. Hand knob |
| 2. Riveter | 6. Pinwheel |
| 3. Quick release pin | 7. Body |
| 4. Arm assembly | |

- (10) Check retaining pins for tightness and flares, using dial vernier caliper, to verify proper flare dimension per figure 21. Correct as necessary.
- (11) Remove hand knobs(5) and rotate pinwheels(6) to position pads marked 2ND STATOR FRONT at top.
- (12) Set REF A dimension (figure 23) to 3.180 inches for front flange retaining pin flaring.
- (13) Turn stator assembly rear flange up, and place it onto PWA 71273 flaring adapter with retaining pin positioned on top of body(7), and repeat flaring process for front retaining pins.
- (14) Remove anvil(1) and remove stator assembly from PWA 71273 flaring adapter.
- (15) Check retaining pins for tightness and flares, using dial vernier caliper, to verify proper flare dimension per figure 21. Correct as necessary.
- n. Repeat process for additional stator vanes requiring replacement.
- o. Inspect retaining pins for looseness or damage. Replace loose or damaged retaining pins.
- p. Fluorescent penetrant inspect. Refer to T.O.2-1-111, SPOP 62. No cracks allowed.
- q. Apply PWA 407 silicone rubber to air sealing ring flanges per paragraph 4.
- r. Repair stator assembly outer diameter rubber sealant. (See figure 24.)
 - (1) Verify platform gaps at new and adjacent vanes are free from old rubber. Remove any extraneous rubber using bristle brush.
 - (2) Clean slots per PWA 83-B2 using lint free cloth dampened with isopropyl alcohol.
 - (3) Thoroughly dry solvent wiped surfaces at ambient temperature or in oven at 250°F (121°C). Drying time shall be sufficient to remove all traces of solvent detrimental to bonding of rubber.
 - (4) Apply PWA 36003 sealant in a bead between stator vane platform per figure 24.
 - (5) Cure sealant per PWA 615.
 - (a) Initial cure for 24 hours minimum at 50 percent relative humidity and room temperature to permit handling.

NOTE

If sealant cross section is less than 0.025 inch, full cure can be waived. Only an additional 48 hours is required after initial cure.

- (b) Full cure at 120 hours at 50 percent relative humidity and room temperature.

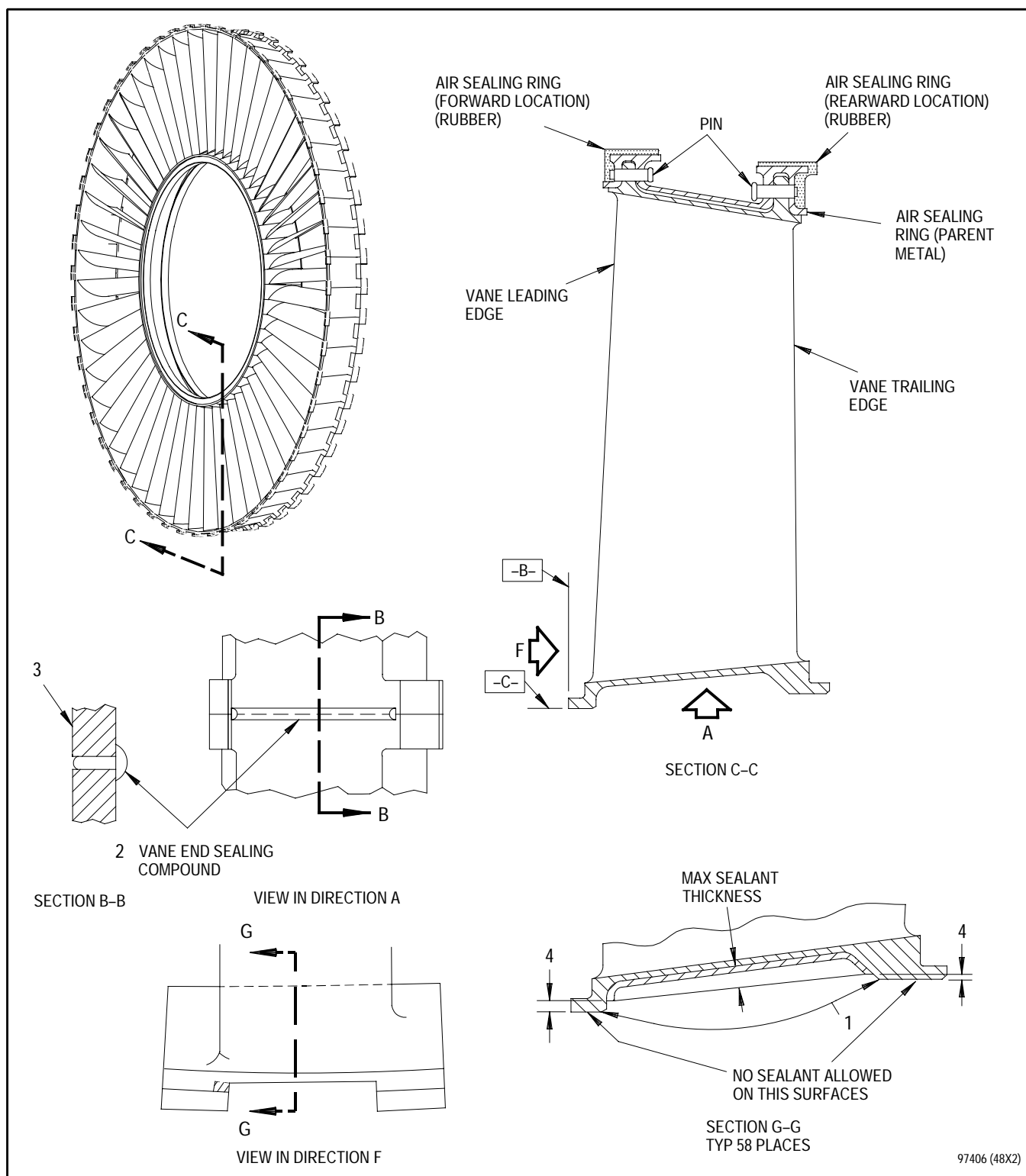


Figure 24. Second Stage Compressor Stator Assembly - Outer Slot Rubber Replacement

Legend for figure 24

1. Sealant (PWA 36003)
2. Complete coverage required as shown. Finish forming of sealant bead not required.
3. Sealant flush or below this surface
4. 0.000 inch (flush) to 0.100 inch from outer surface

7. FIRST AND SECOND STAGE COMPRESSOR STATOR ASSEMBLIES - AIR SEALING RING RUBBER LOCAL REPAIR.

(See Figure 25.)

- a. Repair minor inside diameter tip tears or splits.
 - (1) Apply PWA 36029 (Dow Corning RTV sealant) and cement together.
- b. Repair minor defects that have not penetrated to base metal. Refer to T.O.2J-F100-53-1, WP 100 00.
 - (1) Gently remove loose or extraneous rubber by conventional means.
 - (2) Refill with PWA 407 silicone rubber using spatula to contour rubber to surrounding shape.
 - (3) Initial cure rubber for 1 hour at 300°F (149°). Part may be cured in oven or by locally application of heat.
 - (4) Final cure rubber for 1 hour at 400°F (204°C). Part may be cured in oven or by locally applied heat.
 - (5) Hand blend new rubber using 90 grit silicon carbide cloth. Rubber repair to be smooth and match contour of surrounding rubber.

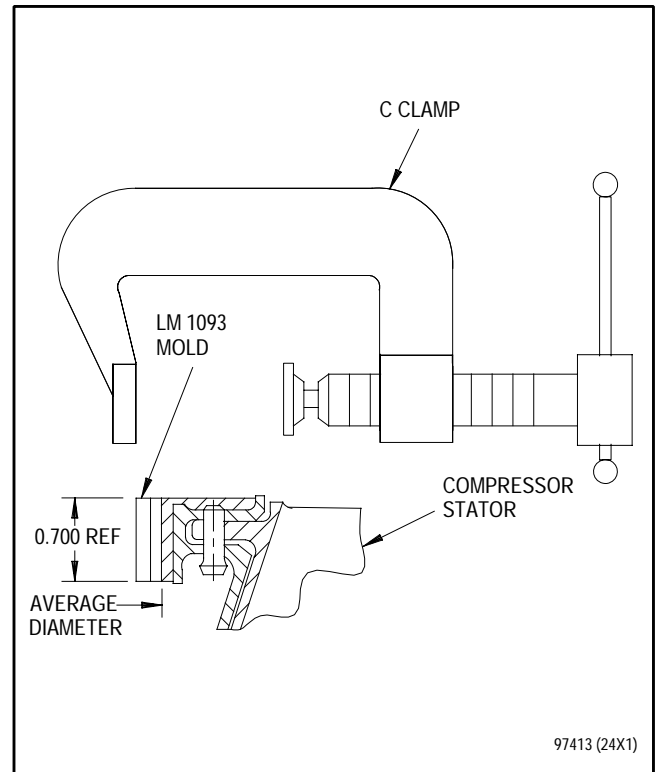
- c. Repair defects which require rubber removal to base metal. Refer to T.O.2J-F100-53-1, WP 100 00.
 - (1) Remove rubber from defect area down to base metal by conventional means.
 - (2) Visually inspect to verify no extraneous or loose rubber is in repair area.
 - (3) Remove old primer on base metal using 300 grit or finer aluminum oxide cloth.
 - (4) Wipe repair area using lint free cloth dampened with isopropyl alcohol. Air dry for 10 minutes.



Failure to avoid contact with rubber in repair area when applying primer to metal surface will cause contamination of bond.

- (5) Apply PWA 556 primer to metal surface within 20 minutes of cleaning. Avoid contact with rubber surface.
 - (a) Primer application may be by brushing, spraying, or wiping to a dry film thickness approximately 0.0001 inch thick in single application.
 - (b) Cure primer for 2 hours minimum at room temperature and 50 percent humidity.
- (6) Fill repair area with PWA 407 silicone rubber using spatula or equivalent tool. Avoid excess application.

- (7) Apply LM 1093 sheet metal mold to repair area, Teflon coated surface against rubber. Secure using C clamps with light to medium pressure. (See figure 25.)
- (8) Initial cure rubber for 1 hour at 300°F (149°). Part may be cured in oven or by locally application of heat.
- (9) Final cure rubber for 1 hour at 400°F (204°C). Part may be cured in oven or by locally applied heat.
- (10) Hand blend new rubber using 90 grit silicon carbide cloth. Rubber repair to be smooth and match contour of surrounding rubber. Alternatively, part may be machined per paragraph 3 or 4.
- (11) Inspect repaired rubber.
 - (a) Inspect for discoloration. No grey rubber allowed.
 - (b) Check hardness of repaired area. Hardness shall be 40 to 65 Durometer A when tested per ASTM D2240.



**Figure 25. Air Sealing Ring Repair
With LM 1093 Sheet Metal Mold**

**8. FIRST AND SECOND STAGE COMPRESSOR
STATOR ASSEMBLIES - OUTER STATOR VANE
SLOT RUBBER REPAIR.**

(See Figures 16 and 24.)

- a. Remove extraneous rubber from vane slots requiring rubber sealant repair. Use nylon bristle brush, razor blade, or knife.
- b. Clean slots per PWA 83-B2 using lint free cloth dampened with isopropyl alcohol.
- c. Thoroughly dry solvent wiped surfaces at ambient temperature or in oven at 250°F (121°C). Drying time shall be sufficient to remove all traces of solvent detrimental to bonding of rubber.
- d. Apply PWA 36003 sealant in a bead between stator vane platform per figure 16 or 24.

e. Cure sealant per PWA 615.

- (1) Initial cure for 24 hours minimum at 50 percent relative humidity and room temperature to permit handling.

NOTE

If sealant cross section is less than 0.025 inch, full cure can be waived. Only an additional 48 hours is required after initial cure.

- (2) Full cure at 120 hours at 50 percent relative humidity and room temperature.

WORK PACKAGE

TECHNICAL PROCEDURES

DISK ASSEMBLY, DRUM ROTOR, FRONT COMPRESSOR-

REPAIR

EFFECTIVITY: ENGINE MODELS F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 36

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 36					29

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
General Procedures - Marking, Temporary - - - - -	SWP 023 01
Inlet/Fan Module - - - - -	T.O. 2J-F100-53-6
Inlet/Fan Module - Cleaning - - - - -	WP 201 00
Disk Assembly, Drum Rotor, Front Compressor -Inspection	WP 322 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
ALCOHOL, ISOPROPYL (PMC 9094)	TT-I-735
CLOTH, DRY, LINT-FREE	-
COMPOUND, ANTIGALLING (PWA 36545)	ESNALUBE 382
SHOT, STEEL, CAST SIZE 110	MIL-S-13165/SAE 110
SHOT, STEEL, CAST SIZE 170	MIL-S-13165/SAE 170

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

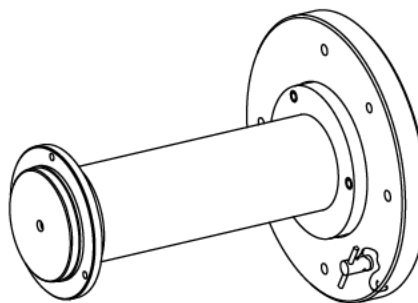
Paragraph	Function - Tool Nomenclature	Tool Number
5	FRONT COMPRESSOR DRUM ROTOR DISK ASSEMBLY-BEARING JOURNAL AND SEAL SEATING MATING SURFACE REPAIR	
	GAGE, DRUM ROTOR, 3.94195 DIAMETER - - - - -	SAALC 8041524
	PLUG, SET, MASTER,, DRUM ROTOR, 3.94195 DIAMETER - -	SAALC 8041525
14	FRONT COMPRESSOR DRUM ROTOR DISK ASSEMBLY - SHOTPEENING	
	FIXTURE, ALMEN TEST STRIP, DISK DRUM ROTOR FRONT COMPRESSOR, ASSY OF - - - - -	PWA 71289
	PEDESTAL, AUTOMATED SHOTPEEN INSTALLATION - - - - -	PWA 70449
	STRIP, ALMEN TEST, 6TH STAGE COMPRESSOR BLADE, SHOT PEEN - - - - -	PWA 32704
	FIXTURE, ALMEN TEST STRIP, DISK DRUM ROTOR FRONT COMPRESSOR, ASSY OF - - - - -	PWA 71290
	FIXTURE, ALMEN TEST STRIP, DISK DRUM ROTOR FRONT COMPRESSOR, ASSY OF - - - - -	PWA 71291
	MASK, SHOTPEEN INNER, 4TH AND 5TH STAGE DRUM ROTOR -	PWA 71286
	MASK, SHOTPEEN, DISK DRUM ROTOR FRONT COMPRESSOR, ASSY OF - - - - -	PWA 71287
	FIXTURE, SHOTPEEN, DISK DRUM ROTOR FRONT COMPRESSOR, ASSY OF - - - - -	PWA 71284
	EYE, LIFTING, DISK DRUM ROTOR FRONT ASSY - - - - -	PWA 71096
	ADAPTER, REAR, LIFT, DISK DRUM ROTOR FRONT COMPRESSOR - - - - -	PWA 71292
	FIXTURE, SHOTPEEN, DISK DRUM ROTOR FRONT COMPRESSOR, ASSY OF - - - - -	PWA 71285

ILLUSTRATED SUPPORT EQUIPMENT



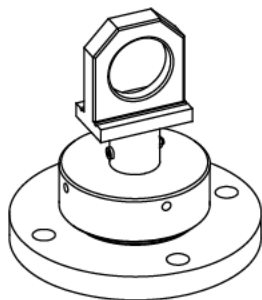
PWA 32704 -C

Figure T1. PWA 32704 STRIP



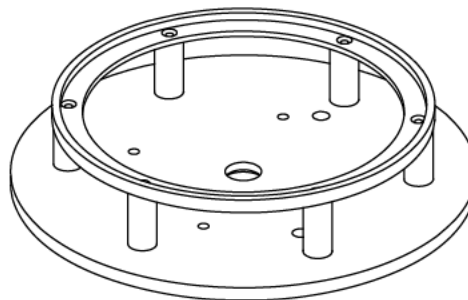
PWA 70449 -C

Figure T2. PWA 70449 PEDESTAL



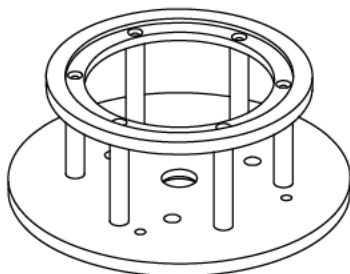
PWA 71096 -C

Figure T3. PWA 71096 EYE



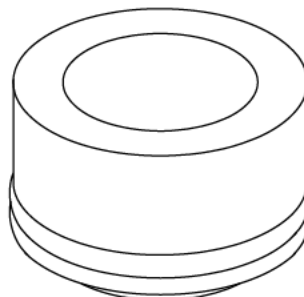
PWA 71284 -C

Figure T4. PWA 71284 FIXTURE



PWA 71285 -C

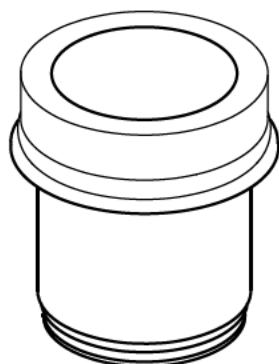
Figure T5. PWA 71285 FIXTURE



PWA 71286 -C

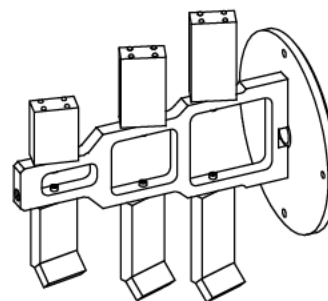
Figure T6. PWA 71286 MASK

ILLUSTRATED SUPPORT EQUIPMENT (continued)



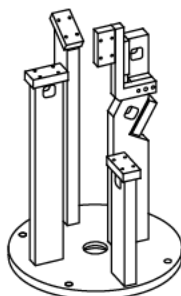
PWA 71287 -C

Figure T7. PWA 71287 MASK



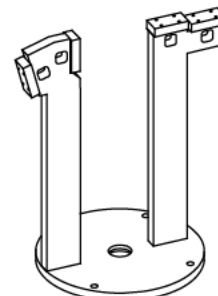
PWA 71289 -C

Figure T8. PWA 71289 FIXTURE



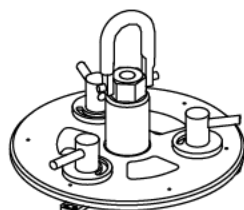
PWA 71290 -C

Figure T9. PWA 71290 FIXTURE



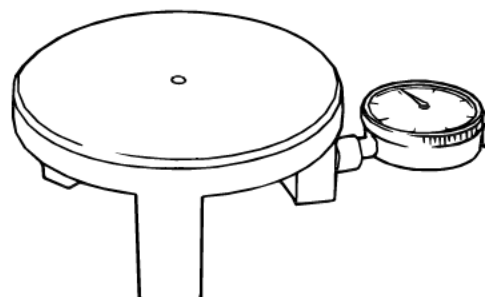
PWA 71291 -C

Figure T10. PWA 71291 FIXTURE



PWA 71292 -C

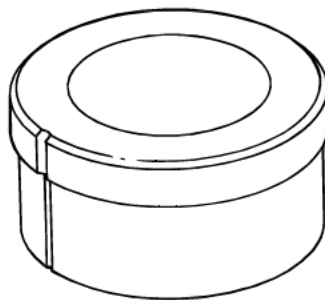
Figure T11. PWA 71292 ADAPTER



SAALC 8041524 -C

Figure T12. SAALC 8041524 GAGE

ILLUSTRATED SUPPORT EQUIPMENT (continued)



SAALC 8041525 -C

Figure T13. SAALC 8041525 PLUG

1. INTRODUCTION.

- a. This work package contains instructions for repair of front compressor drum rotor disk assembly.

2. FRONT COMPRESSOR DRUM ROTOR DISK ASSEMBLY- BLEND REPAIR.

(See Figure 1.)



Under no circumstances shall snap diameters of drum be changed. Evaluation of disk growth would be impaired.

NOTE

- Blend area locations and limits are in figure 1 and WP 322 00.
- No blend within 0.250 inch of holes Z in figure 1.
- a. Blend damaged areas using silicon or aluminum oxide abrasive cloth, fine stone or files. Remove all traces of damage within limits shown while removing minimum amount of material. Refer to T.O. 2-1-111, SPOP 532.
- (1) Blend depth for damage shall not exceed 0.005 inch after blending.

(2) Minimum width of blends shall be 50 times the depth of damage.

(3) Surface texture shall be as smooth or smoother than surrounding area.

b. Fluorescent penetrant inspect blended areas per T.O. 2-1-111, SPOP 82. No cracks allowed.

c. Eddy current inspect blend areas on scallop flange per T.O. 2J-F100-9.

NOTE

- Figure 1 identifies areas where shotpeening is not allowed. All blended areas shall be shotpeened, except as specified.
- Where required, eddy current inspection of blended areas shall be performed before shotpeening.
- d. Shotpeen blended areas per figure 1 and paragraph 14.

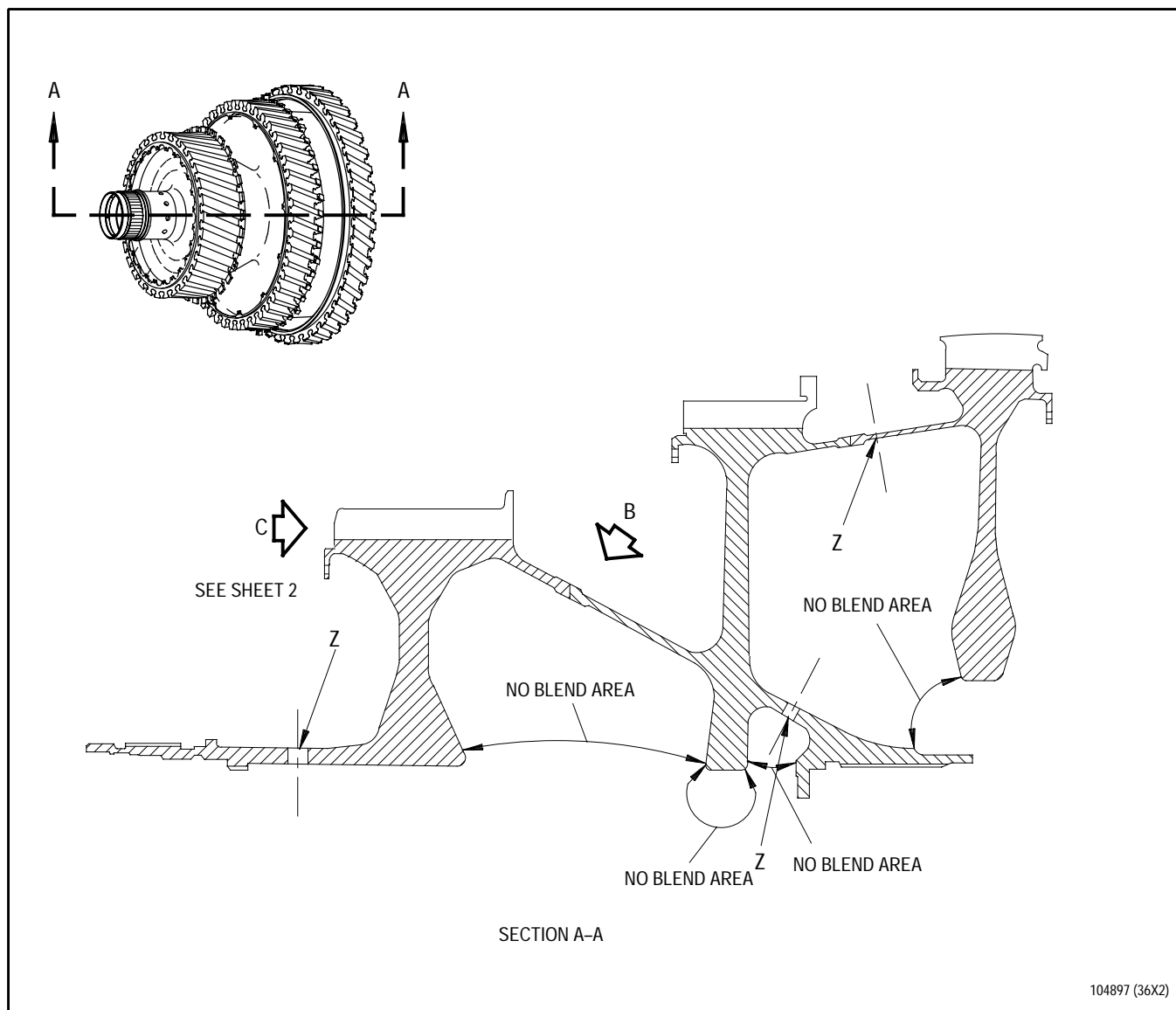
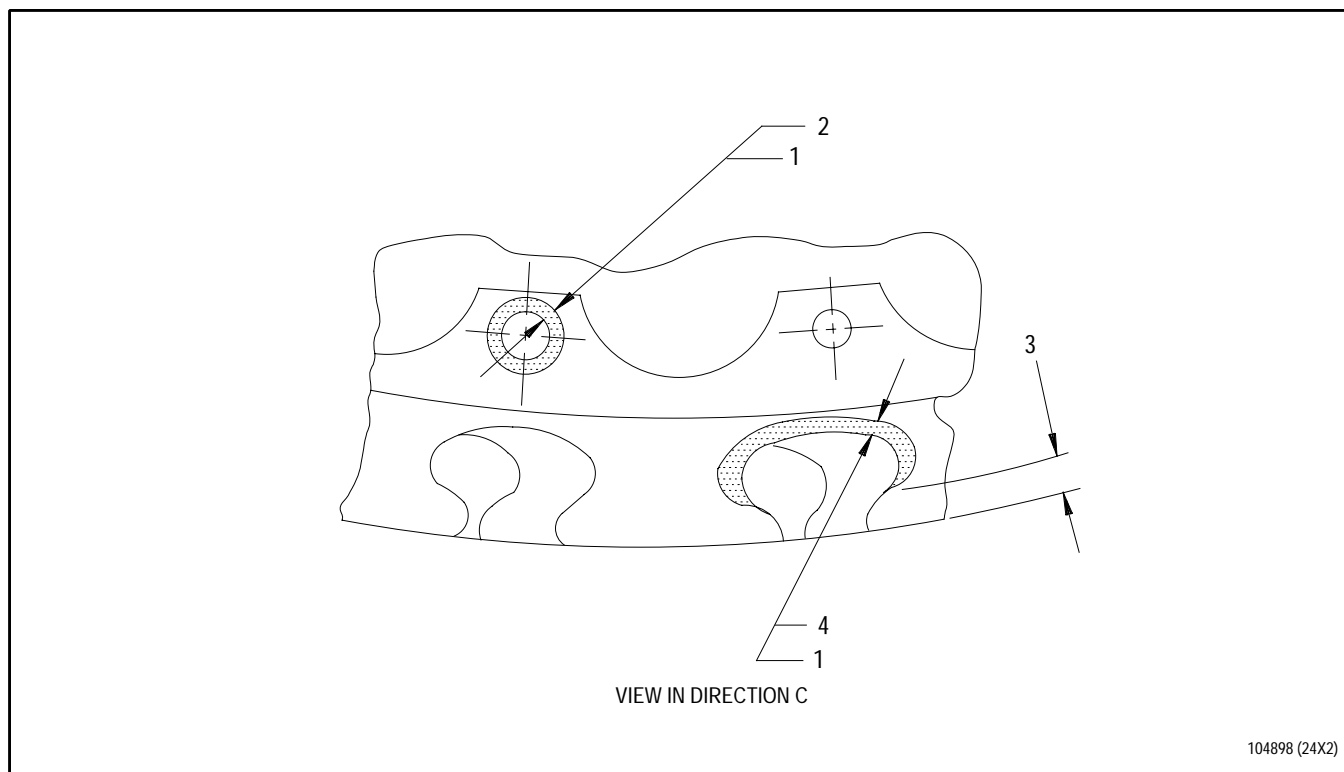
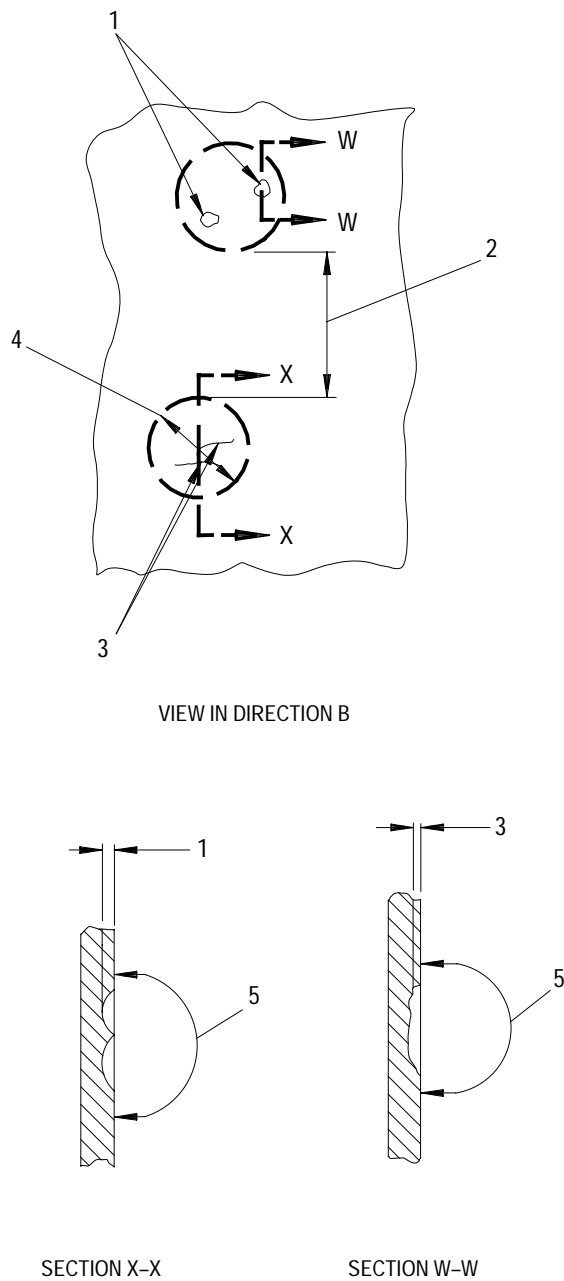


Figure 1. Front Compressor Drum Rotor Disk Assembly - Blend Repair (Sheet 1 of 3)



1. Repair not allowed in this area.
2. 0.125 inch minimum all around typical holes.
3. 0.185 inch maximum.
4. 0.060 inch maximum around contour both sides, all slots to dimension identified in index 3.

Figure 1. Front Compressor Drum Rotor Disk Assembly - Blend Repair (Sheet 2 of 3)



104899 (48X2)

Figure 1. Front Compressor Drum Rotor Disk Assembly- Blend Repair (Sheet 3 of 3)

Legend for figure 1

1. Typical nick, pit, or dent.
2. 2.000 inch minimum, both sides of web.
3. Scratches.
4. 1.000 inch diameter maximum, typical blend.
5. Shotpeen area.

3. FRONT COMPRESSOR DRUM ROTOR DISK ASSEMBLY - BALANCE WEIGHT FLANGE TANG REMOVAL.

(See Figure 2.)

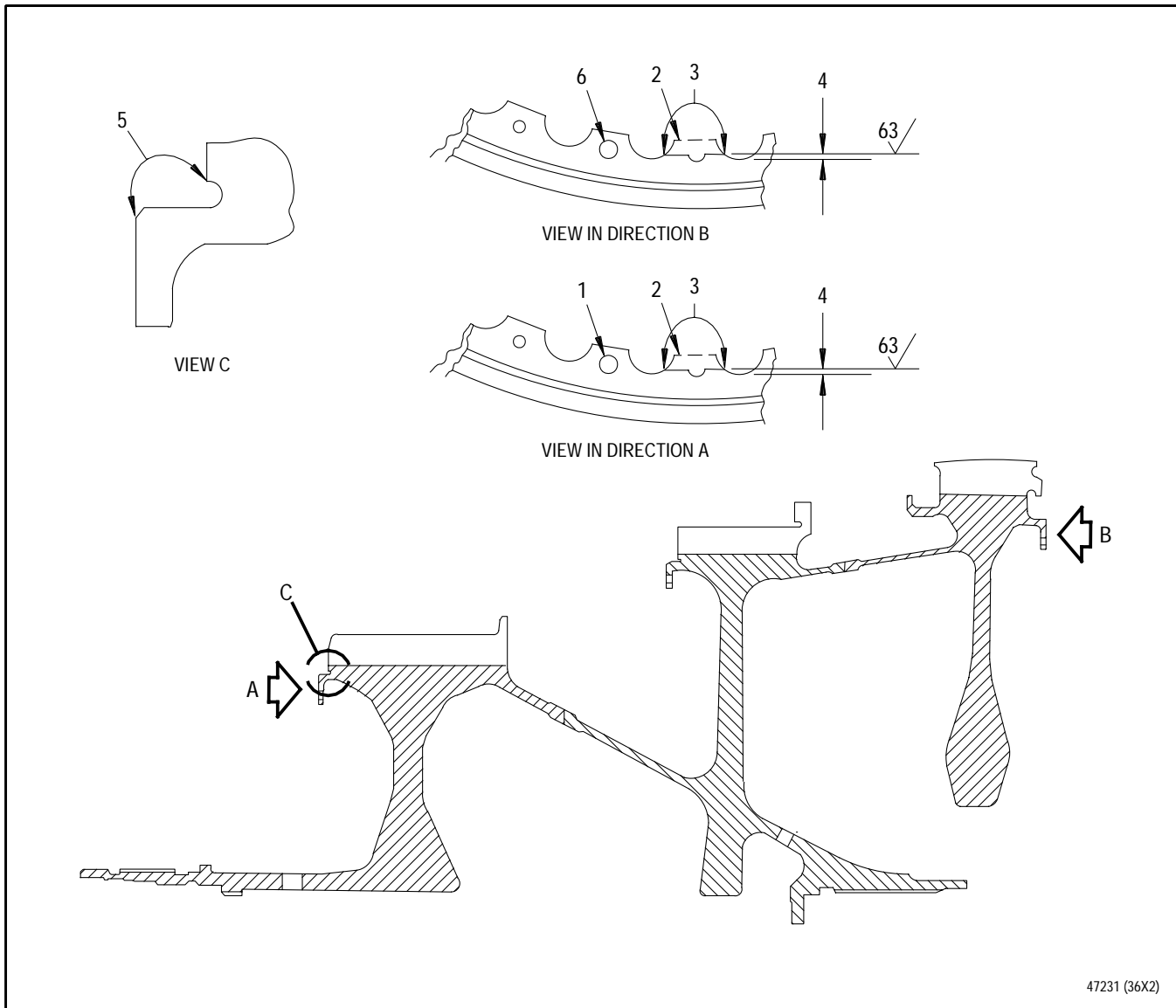
NOTE

No repair is permitted for 12 adjacent tangs with 0.190 inch diameter holes, used for retaining front compressor inlet air seal

- a. Fluorescent penetrant inspect damaged tangs per T.O. 2-1-111, SPOP 82. No cracks allowed.
- b. Remove unserviceable tang and tang 180° opposite per to figure 2.
- c. Fluorescent penetrant inspect machined area per T.O. 2-1-111, SPOP 82. No cracks allowed
- d. Eddy current inspect blend areas on scallop flange per T.O. 2J-F100-9.
- e. Shotpeen machined area per T.O. 2-1-111, SPOP 501 with intensity 10N-18N using SAE 110 maximum cast steel shot of hardness 45-55 HRC or equivalent.

Legend for figure 2

1. Tangs with 0.190 inch diameter holes-no repair permitted, 12 places.
2. Remove bent balance weight tang and tang 180 degrees from bent tang.
3. Shotpeen machined areas per text.
4. 0.005 to 0.040 inch.
5. No shotpeening permitted in this area.
6. Tangs with 0.150 inch diameter holes-no repair permitted, 12 places.



47231 (36X2)

Figure 2. Front Compressor Drum Rotor Disk Assembly - Balance Weight Flange Tang Removal

4. FRONT COMPRESSOR DRUM ROTOR DISK ASSEMBLY-NUT THREAD REPAIR.

(See Figure 3.)

NOTE

Nut shall be installed after blending and before installation and stack-up to ensure that threads do not pick up and gall.

- a. Remove damage using fine file or honing stone, as follows:



Be careful not to remove protective finish unnecessarily.

- (1) If entrance thread is removed, lead-in radii shall be contoured same as original. Total removal of entrance thread is permissible.

(2) Remove all thread pickup and high metal.

(3) Cumulative length of damage on outer threads shall not exceed half of one complete thread.

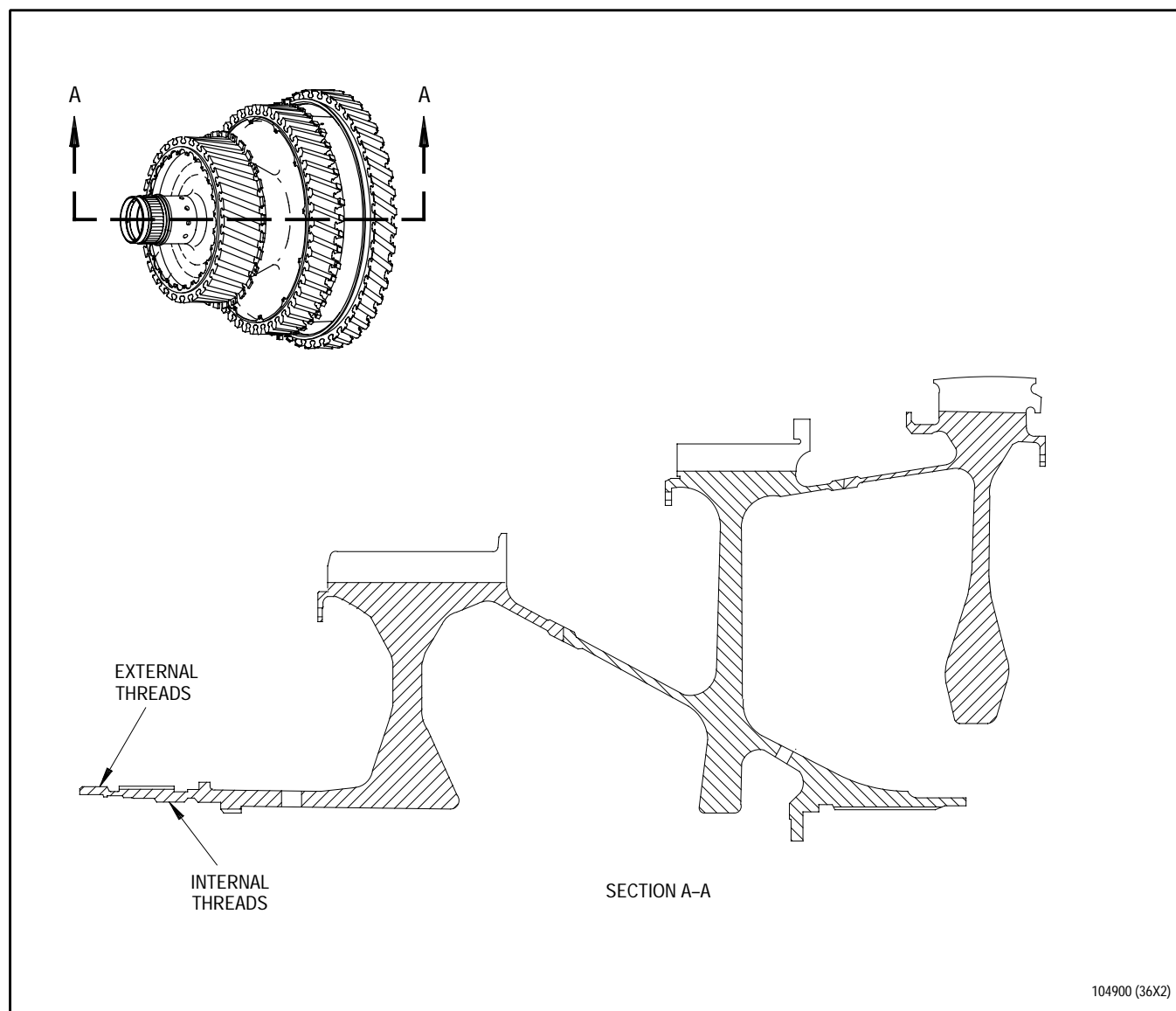


Figure 3. Front Compressor Drum Rotor Disk Assembly - Nut Thread Repair

**5. FRONT COMPRESSOR DRUM ROTOR DISK
ASSEMBLY-BEARING JOURNAL AND SEAL
SEATING MATING SURFACE REPAIR.**

(See Figures 4 and 5.)

a. Machine snap diameter to remove high metal and clean up surface. Remove only minimum amount of material. Minimum diameter shall be 3.943 inches for Diameter Y and 3.938 inches for Diameter A per figure 4.

b. Use SAALC 8041524 gage to measure Diameter A(4, figure 5) as follows:

(1) Set up gage by installing SAALC 8041525 plug in gaging diameter of gage.

(2) Note alignment of slot in plug with timing pin of gage.

(3) Ensure indicator pad of gage is contacting large OD of plug. Set dial indicator to zero.

NOTE

Removal of plug from gage should result in gage indicator movement in negative direction. When plug is reinstalled in gage, indicator reading of zero should be retained.

(4) Install gage on front hub end of drum rotor per figure 5.

(5) Note detail-2 timing pin location to ensure engagement with one of the 42 slots.

(6) Record positive or negative gage reading variation from zero set reading.

(7) Continue taking readings with timing pin located in each of 42 slots or as required.

c. Fluorescent penetrant inspect machined areas per T.O. 2-1-111, SPOP 82. No cracks allowed.

d. Shotpeen prior to nickel plate to 8A intensity using SAE 110 shot per paragraph 14.

e. Nickel plate per SPOP 311 except 0.0005 to 0.0015 inch thick. Refer to T.O. 2-1-111.

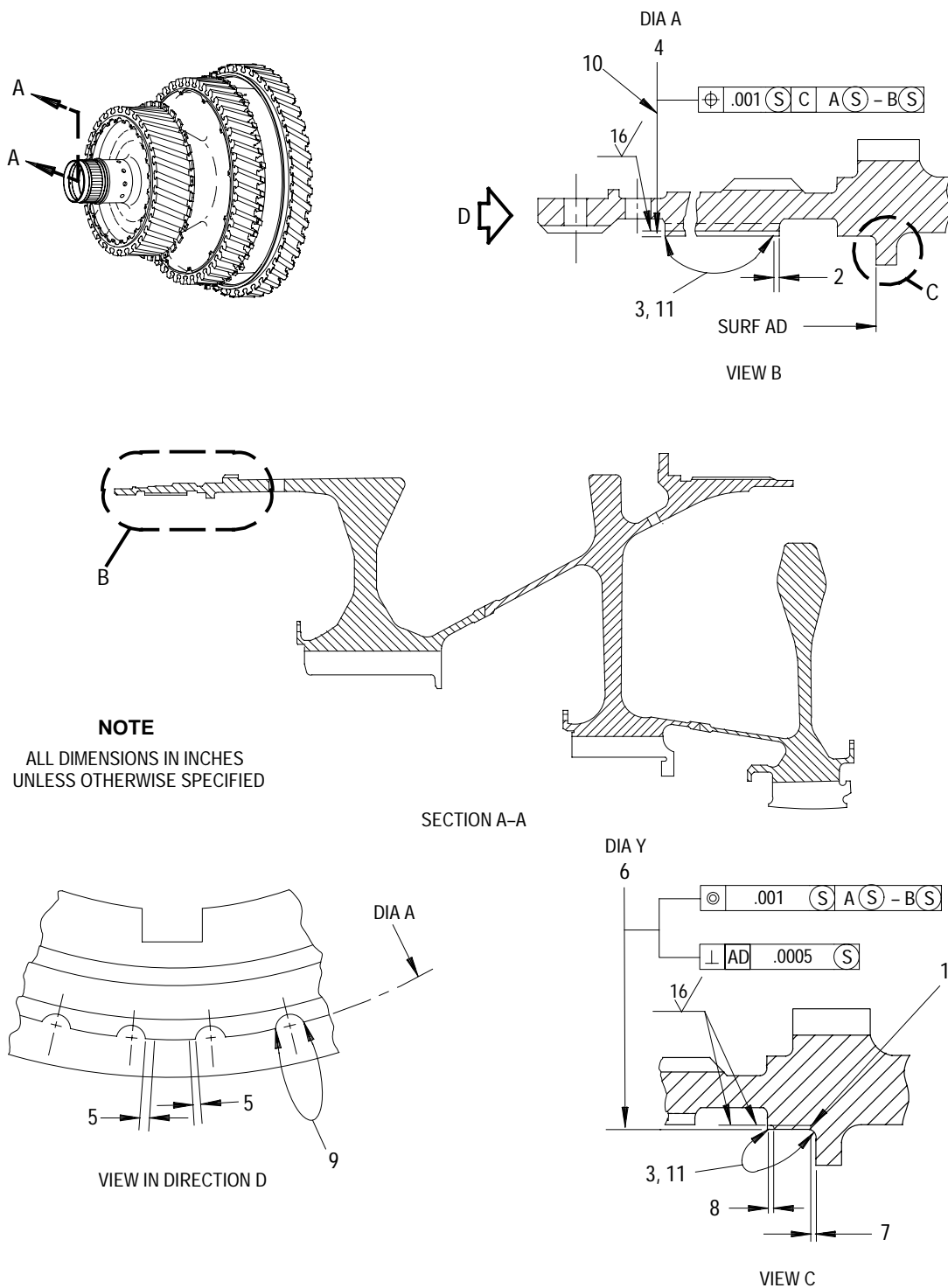
f. Mark beehive symbol adjacent to part number using electrolytic etch or drag impression methods. Refer to T.O. 2-1-111, SPOP 401.

g. Nickel plate areas must be masked for any shotpeening subsequent to nickel plating and final machining.

Legend for figure 4**NOTE**

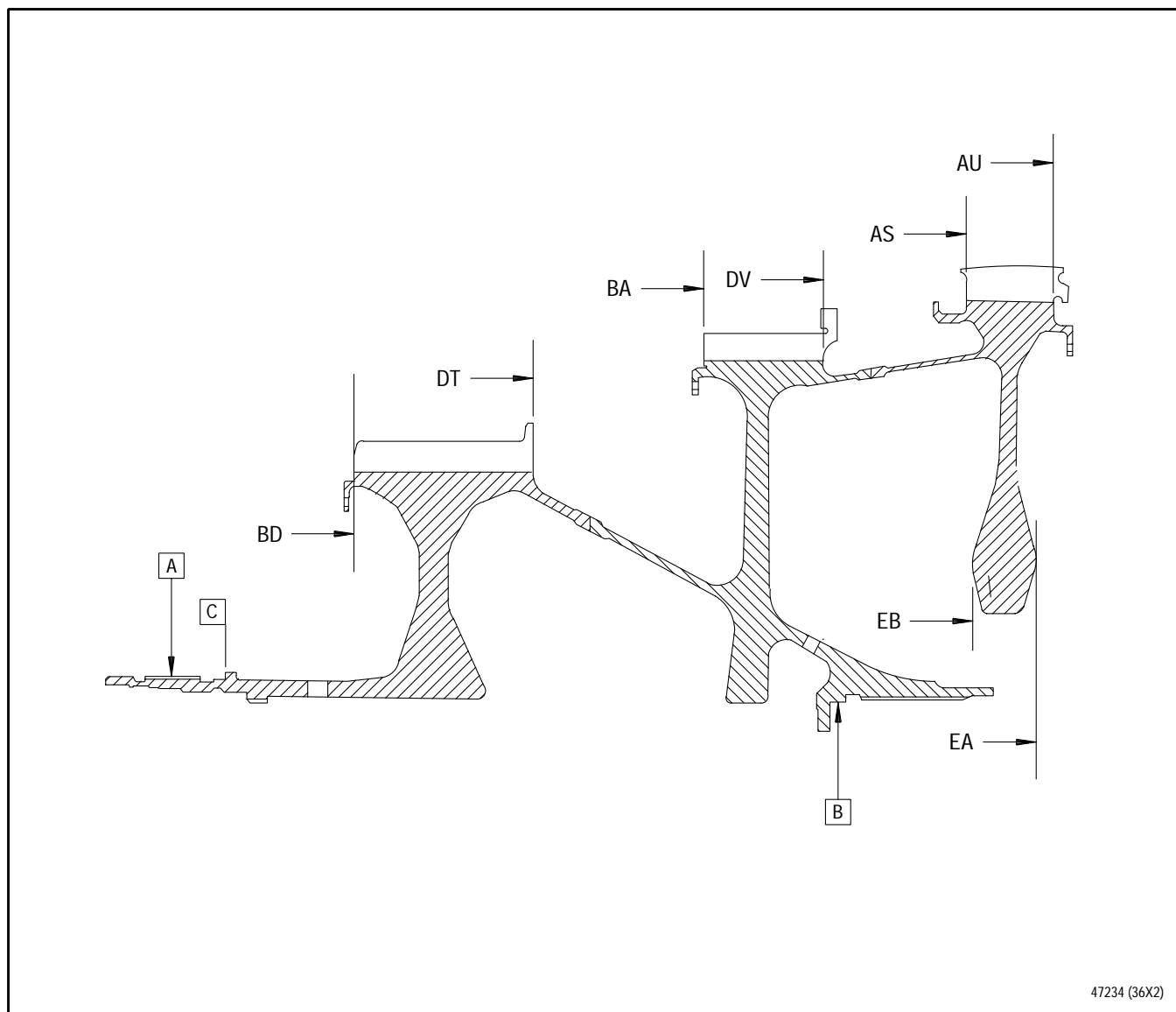
Constraint contact allowed only on Surfaces
BD,DT,BA,DV,AU,AS,EA,EB.

1. 0.020 to 0.030 inch radius
2. 0.025 to 0.040 inch, both ends, 43 places
3. Nickel plate per text.
4. 3.9415 to 3.9424 inches final machine diameter.
Diameter, regardless of feature size, must be located within 0.001 inch of true position in relation to Diameter C, Diameter A (regardless of feature size), and Diameter B (regardless of feature size). Concentricity requirement must be met at clean-up machine and at final machine.
5. 0.025 inch, 43 places. Nickel plate optional and may be incomplete within this distance.
6. 3.9465 to 3.9473 inches diameter final machine.
Diameter, regardless of feature size, must be concentric with Diameters A and B, regardless of feature size, within 0.001 inch. Diameter must be perpendicular with surface within 0.0005 inch, regardless of feature size. Concentricity and perpendicularity requirements shall be met at clean-up machine and at final machine.
7. 0.001 to 0.008 inch.
8. 0.005 to 0.025 inch.
9. No plate permitted in slots, 43 places. Blend repair per WP 322 00.
10. Diameter may vary within limits shown, but taper must not exceed 0.0002 inch total and out of roundness must not exceed 0.0003 inch total. These requirements shall be met at clean-up and final machine.
11. Shotpeen prior to nickel plate to 8A intensity using SAE 110 shot. Refer to T.O. 2-1-111, SPOP 501 for hardness requirements.



104901 (48X2)

**Figure 4. Front Compressor Drum Rotor Disk Assembly-
Bearing Journal and Seal Seat Mating Surfaces Repair (Sheet 1 of 2)**



**Figure 4. Front Compressor Drum Rotor Disk Assembly -
Bearing Journal and Seal Seat Mating Surfaces Repair (Sheet 2 of 2)**

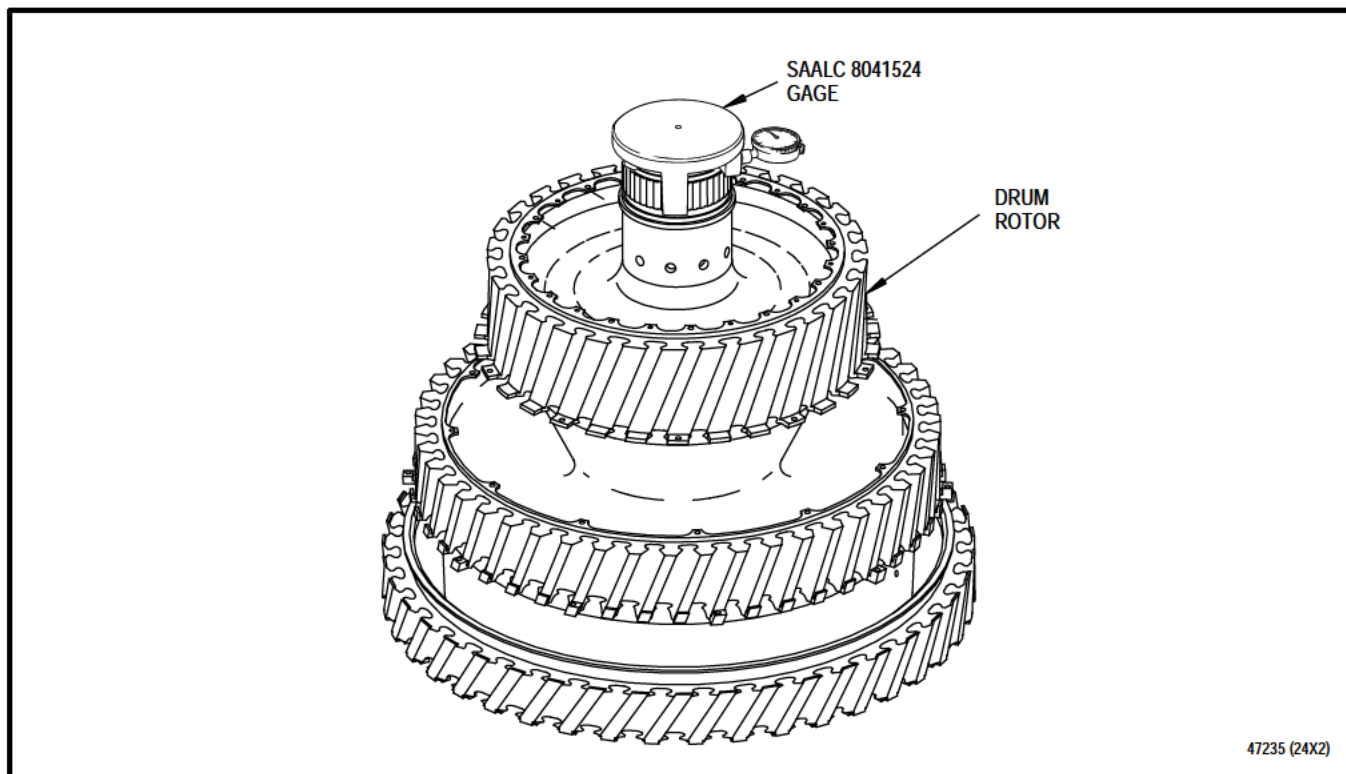


Figure 5. Front Compressor Drum Rotor Disk Assembly-Diameter A Measurement

6. FRONT COMPRESSOR DRUM ROTOR DISK ASSEMBLY- REPAIR OF END SLOTS (THREE EACH).

(See Figure 6.)

NOTE

Each of the 0.295 to 0.305 inch slots may be repaired, if damaged or cracked, by reoperating to maximum dimensions shown. If one slot is reoperated, the other two slots shall be reoperated.

- a. Nondestructive inspect slot area to determine extent of cracking. Refer to T.O. 2-1-111, SPOP 82. No cracks allowed.

- b. Machine all three slots to dimensions shown. Surface finish per PWA 362-12. Refer to T.O. 2-1-111. Grinding, if used, shall conform to PWA 106. Refer to T.O. 2-1-111, SPOP 530.
- c. Nondestructive inspect slot area for cracks. Refer to T.O. 2-1-111, SPOP 82. No cracks allowed.

Legend for figure 6

1. Remove minimum amount of material necessary to eliminate damage. Enlarge three slots equally and maintain within 0.005 inch of true position. Do not exceed 0.510 inch width.
2. 0.010 to 0.020 inch radius
3. 221°33' from R
4. 138°26' from R
5. 0.000 to 0.005 inch mismatch allowed
6. Break edge 0.005 to 0.015 inch

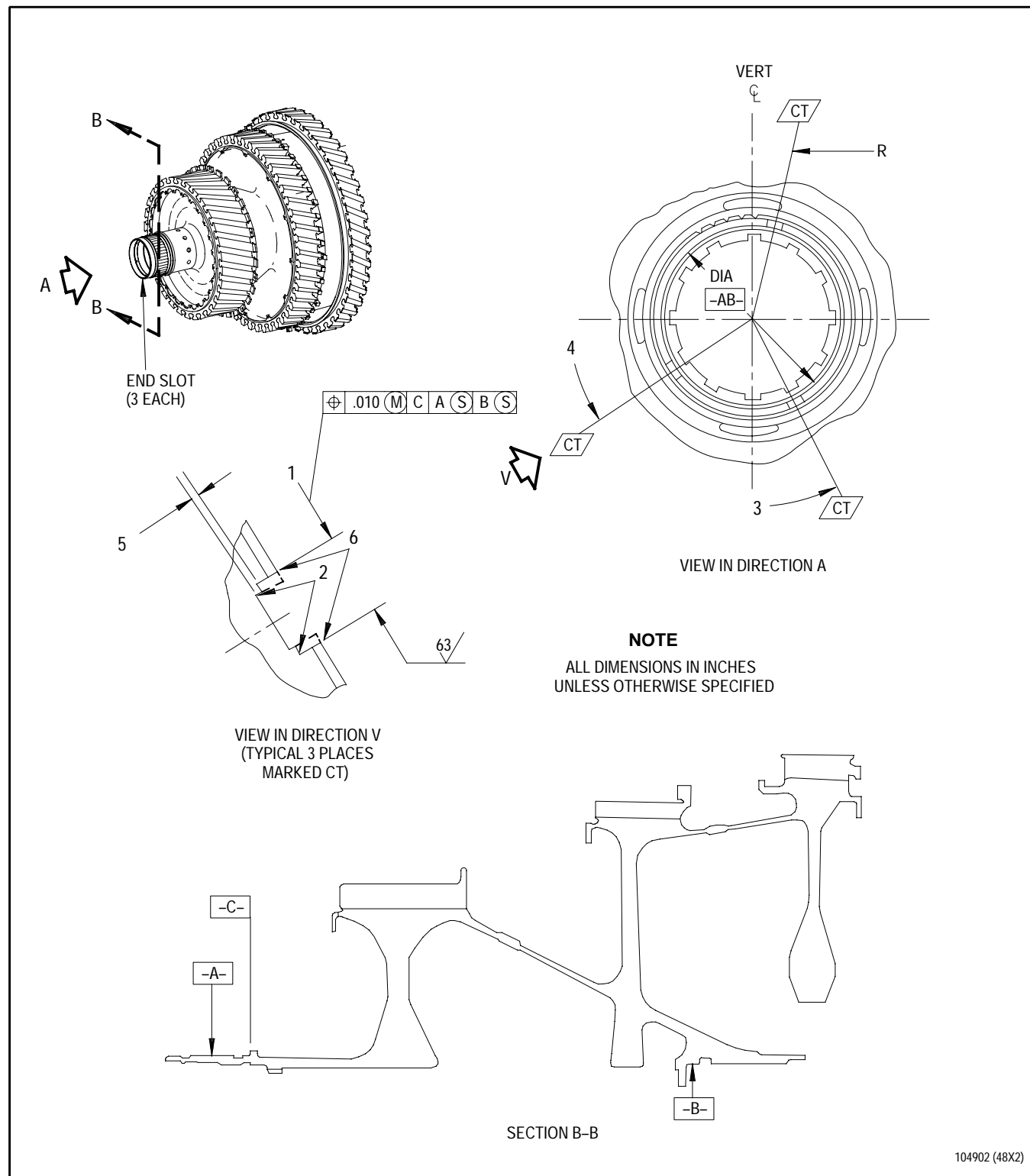


Figure 6. Front Compressor Drum Rotor Disk Assembly-Repair of Slots (Three Each)

7. FRONT COMPRESSOR DRUM ROTOR DISK ASSEMBLY-MACHINING OF NEW END SLOTS (THREE EACH)

(See Figure 7.)

- a. Nondestructive inspect existing slots and areas to be machined to ensure cracks are not present. Refer to T.O. 2-1-111, SPOP 82.
- b. Machine three new slots(5) as shown in figure 7. New slots(5) are positioned 28 degrees clockwise from existing slots(6). Grinding, if used, shall conform to PWA 106. Refer to T.O. 2-1-111, SPOP 530.
- c. Surface finish per PWA 362-12. Refer to T.O. 2-1-111.
- d. Nondestructive inspect. Refer to T.O. 2-1-111, SPOP 82. No cracks allowed.

8. FRONT COMPRESSOR DRUM ROTOR DISK ASSEMBLY-REPAIR OF FIRST SET OF NEW END SLOTS (THREE EACH).

(See Figures 6 and 7.)

NOTE

Each of the three 0.295 to 0.305 inch end slots(5, figure 7) may be repaired, if damaged or cracked, by reoperating to maximum dimension shown in View V of figure 6. If one slot is reoperated, the other two slots shall be reoperated.

- a. Nondestructive inspect slot area to determine extent of cracking. Refer to T.O. 2-1-111, SPOP 82.

- b. Machine all three slots(5, figure 7) to dimensions shown in View V of figure 6. Grinding, if used, shall conform to PWA 106. Refer to T.O. 2-1-111, SPOP 530.
- c. Surface finish per PWA 362-12 per T.O. 2-1-111.
- d. Nondestructive inspect per T.O. 2-1-111, SPOP 82. No cracks allowed.

9. FRONT COMPRESSOR DRUM ROTOR DISK ASSEMBLY - MACHINING OF SECOND SET OF NEW END SLOTS (THREE EACH)

(See Figure 7.)

NOTE

This repair is to be used when the three end slots(5, figure 7) are damaged beyond the 0.510 inch maximum dimension in figure 6. No cracks may be present in any of the existing slots.

- a. Nondestructive inspect existing slots and areas to be machined to ensure cracks are not present. Refer to T.O. 2-1-111, SPOP 82.
- b. Machine three new end slots(8) as shown in figure 7. New slots(8) are positioned 28 degrees clockwise from existing slots(5). Grinding, if used, shall conform to PWA 106. Refer to T.O. 2-1-111, SPOP 530.
- c. Surface finish per PWA 362-12. Refer to T.O. 2-1-111.
- d. Nondestructive inspect. Refer to T.O. 2-1-111, SPOP 82. No cracks allowed.

**10. FRONT COMPRESSOR DRUM ROTOR
DISK ASSEMBLY - REPAIR OF SECOND SET OF
NEW END SLOTS (THREE EACH).**

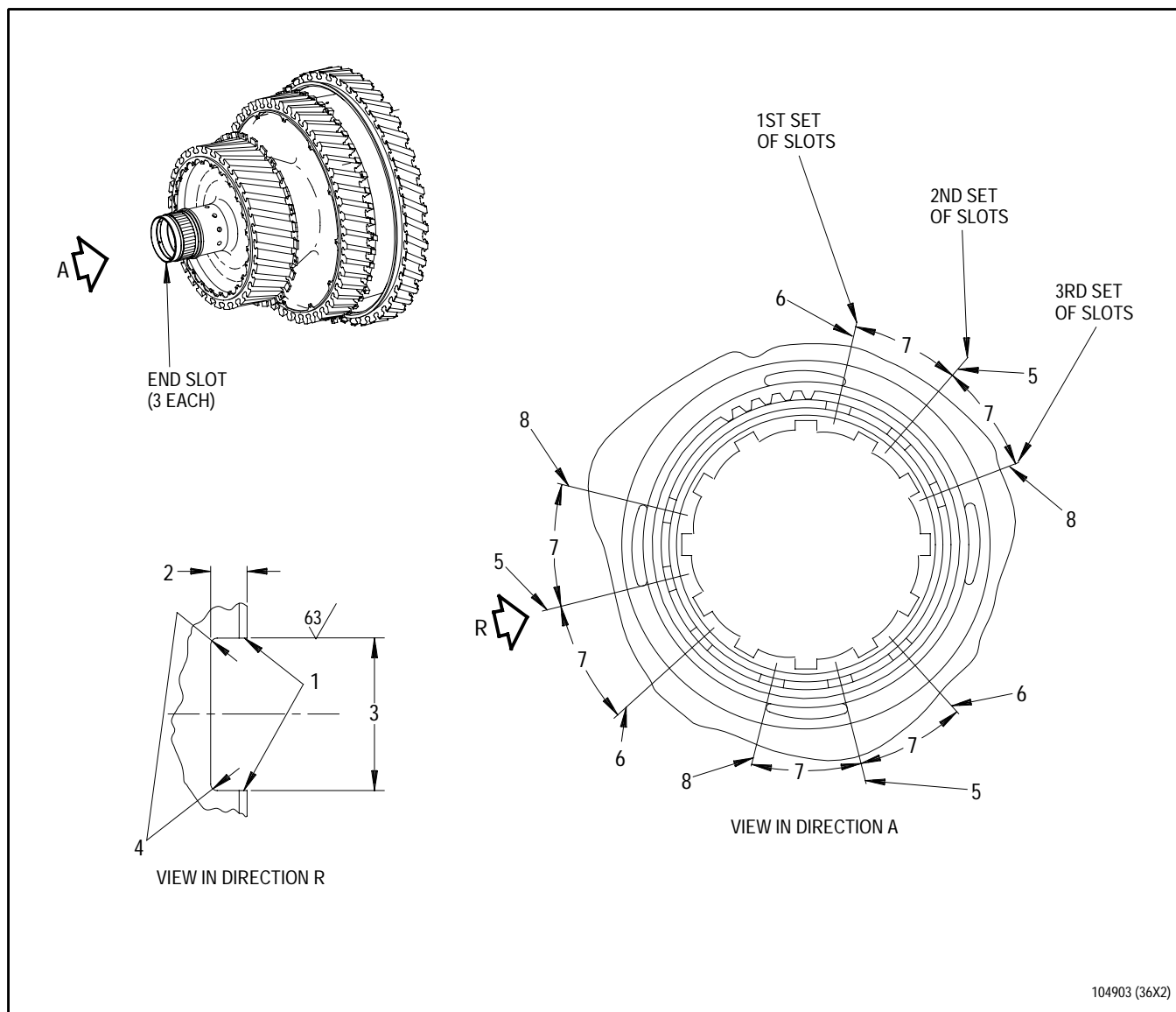
(See Figures 6 and 7.)

NOTE

Each of the three 0.295 to
0.305 inch end
slots(8, figure 7) may be
repaired, if damaged or
cracked, by reoperating to
maximum dimension shown in
View V of figure 6. If one
slot is reoperated, the other
two slots shall be reoperated.

- a. Nondestructive inspect slot area
to determine extent of cracking.
Refer to Refer to T.O. 2-1-111,
SPOP 82.

- b. Machine all three slots
(8, figure 7) to dimensions
shown in View V, figure 6,
clockwise from existing slots
(5, figure 7). Grinding, if
used, shall conform to PWA 106.
Refer to T.O. 2-1-111, SPOP 530.
- c. Surface finish per PWA 362-12.
Refer to T.O. 2-1-111.
- d. Nondestructive inspect. Refer
to T.O. 2-1-111, SPOP 82.
No cracks allowed.



- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 1. Break edge 0.005 to 0.015 inch | 5. Machine new slots, 28° clockwise from existing slot(6). (3 locations) |
| 2. 0.175 to 0.185 inch | 6. Existing slots (3 locations) |
| 3. 0.295 to 0.305 inch Diameter must be located within 0.010 inch of true position, at maximum material condition, with Diameters A and B, regardless of feature size, and with Diameter C. | 7. 28° clockwise |
| 4. 0.010 to 0.020 inch radius | 8. Machine new slots 28° clockwise from existing slot(5) (3 locations) |

Figure 7. Front Compressor Drum Rotor Disk Assembly-Machining of New Slots (Three Each)

**11. FRONT COMPRESSOR DRUM ROTOR
DISK ASSEMBLY - REPAIR OF TOOLING SLOTS
(TWELVE EACH).**

(See Figure 8.)

NOTE

If any one tooling slot requires repair, all 12 slots shall be repaired to provide 12 equally spaced slots of same width within tolerance shown.

- a. Fluorescent penetrant inspect damaged area. Refer to T.O. 2-1-111, SPOP 82. No cracks permitted.
- b. Select most damaged slot and apply repair limits.
- c. If maximum repair dimension or less will remove all of damaged area, set up to repair all 12 slots to produce 12 equally spaced slots of same width.

- d. Machine slots as required per figure 8. Grinding, if used, shall conform to PWA 106. Refer to T.O. 2-1-111, SPOP 530. Surface finish per PWA 362-12. Refer to T.O. 2-1-111. Break edges 0.005 to 0.025 inch. Refer to T.O. 2-1-111.
- e. Fluorescent penetrant inspect lugs. Refer to T.O. 2-1-111, SPOP 82. If cracks extend into 0.330 inch minimum dimension(11, figure 8), repair per paragraph 12.

Legend for figure 8

- 1. 0.105 to 0.110 inch, 2 places
- 2. 8°10' maximum
- 3. This angle as required to remove damage
- 4. 3.210 to 3.230 inch repair diameter
- 5. This slot shall include slot(6)
- 6. Reference slot
- 7. 0.020 to 0.030 inch radius both sides, 12 places
- 8. 0.010 inch maximum mismatch permitted between original slot surface and remachined slot surface.
- 9. Centerline of original slot
- 10. 0.330 inch minimum wall must remain

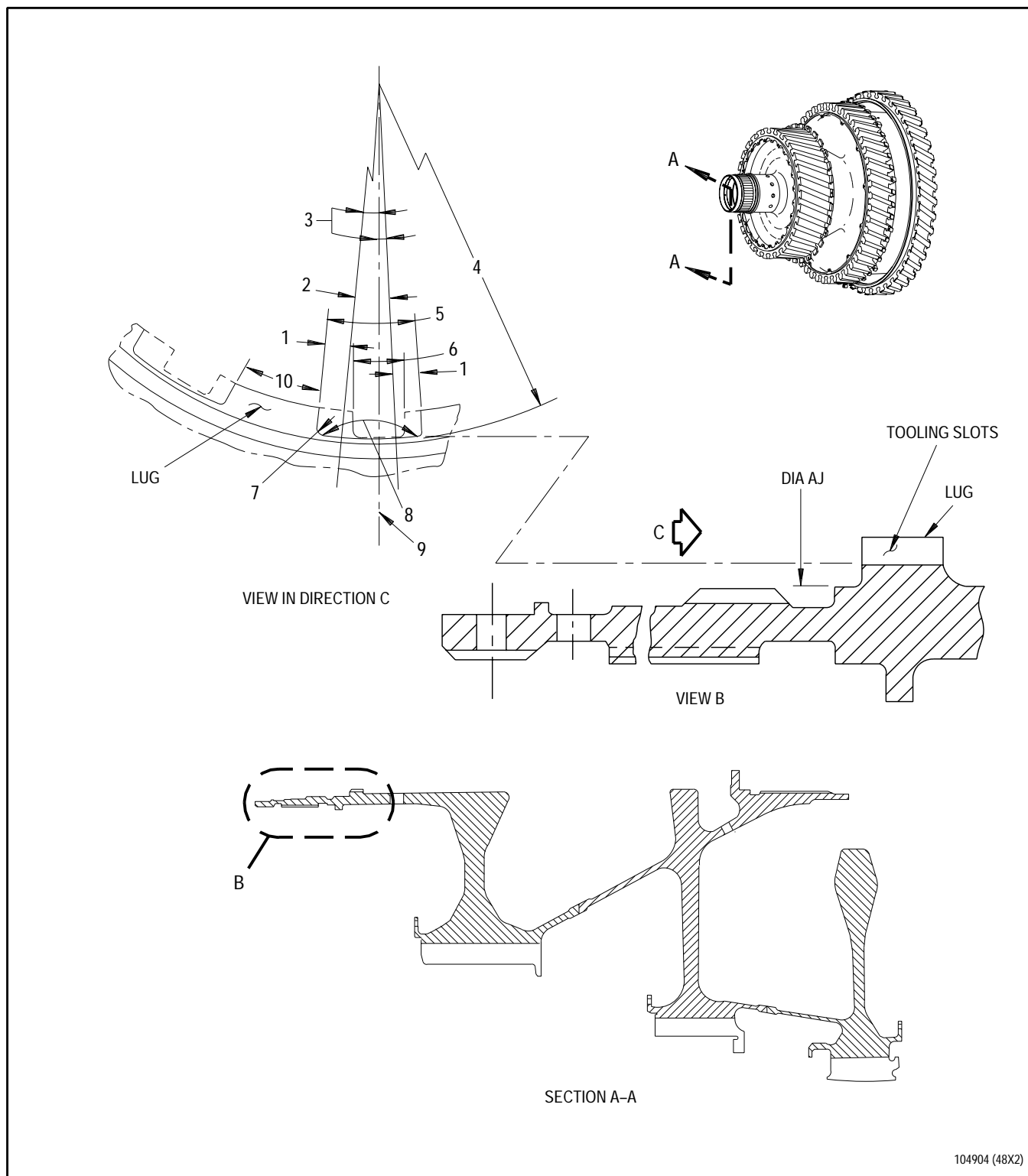


Figure 8. Front Compressor Drum Rotor Disk Assembly - Repair of Slots (Twelve Each)

**12. FRONT COMPRESSOR DRUM ROTOR
DISK ASSEMBLY - REMOVAL OF TOOLING
SLOTS (MACHINING OF LUGS).**

(See Figure 9.)

NOTE

The following repair is to be used only if repairing part per paragraph 11 will not completely remove the damage. A maximum of six lugs between slots may be removed, no two adjacent lugs to be removed.

- a. Machine lugs between slots per figure 9. Grinding, if used, shall conform to PWA 106. Refer to T.O. 2-1-111, SPOP 530. Surface finish per PWA 362-12. Refer to T.O. 2-1-111. Remove only those lugs which are damaged beyond 0.330 inch minimum thickness limit. Break edges 0.005 to 0.025 inch. Refer to T.O. 2-1-111.
- b. Nondestructive inspect slots and machined areas. Refer to T.O. 2-1-111, SPOP 82. No cracks allowed.

Legend for figure 9

1. 0.010 inch maximum mismatch permitted between original slot surface and remachined slot surface.
2. Completely remove lug between slots.
3. Adjacent lugs may be reoperated.
4. Alternate lugs may be removed, if necessary.
5. 1.605 to 1.615 inch radius.
6. 0.330 inch minimum
7. 0.150 to 0.210 inch both sides, 6 places maximum.
8. 0.020 to 0.030 inch radius, both sides, 6 places.

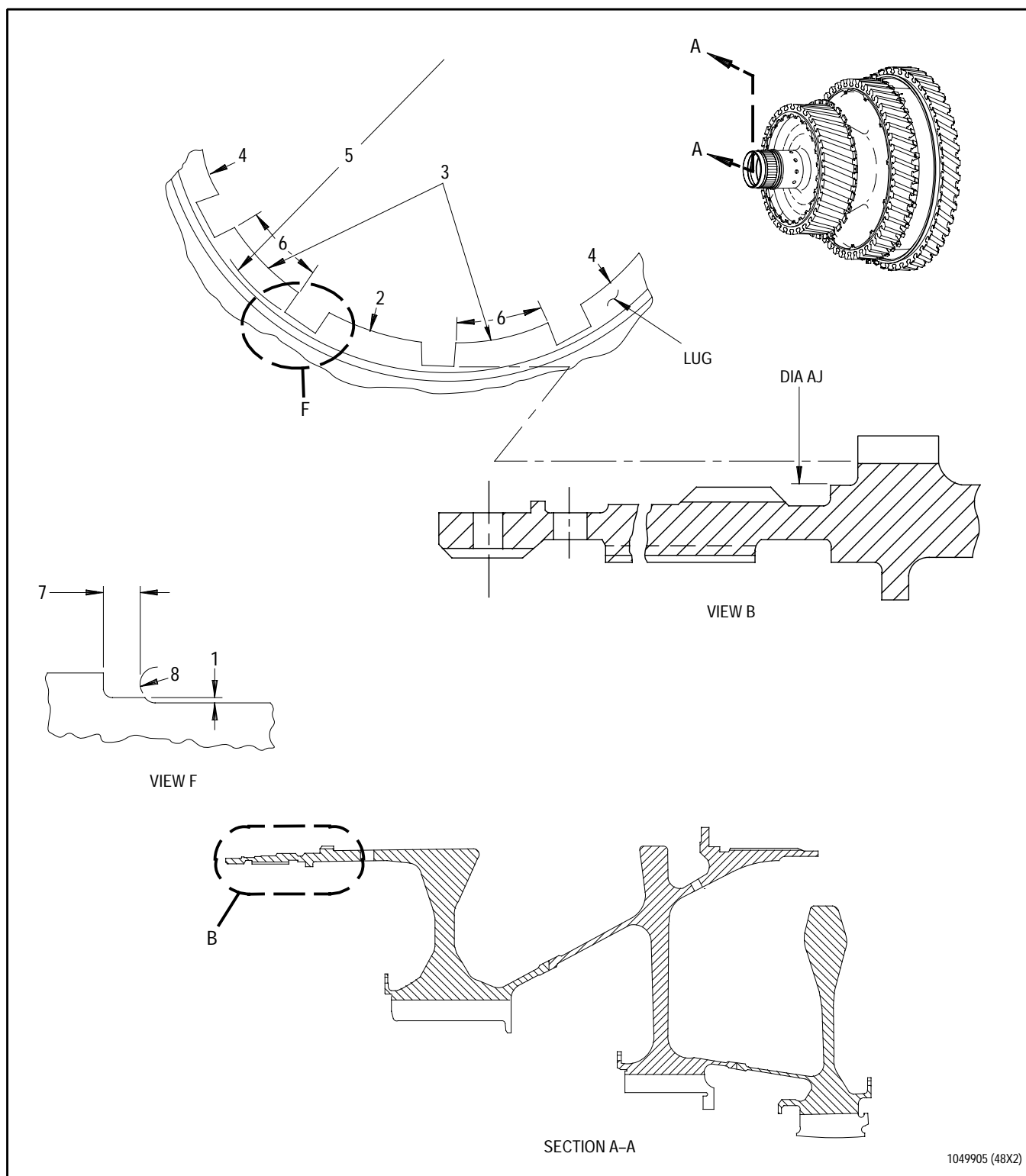


Figure 9. Front Compressor Drum Rotor Disk Assembly - Removal of Slots

**13. FRONT COMPRESSOR DRUM ROTOR
DISK ASSEMBLY - ANTIGALLING COMPOUND
APPLICATION.**

(See Figure 10.)

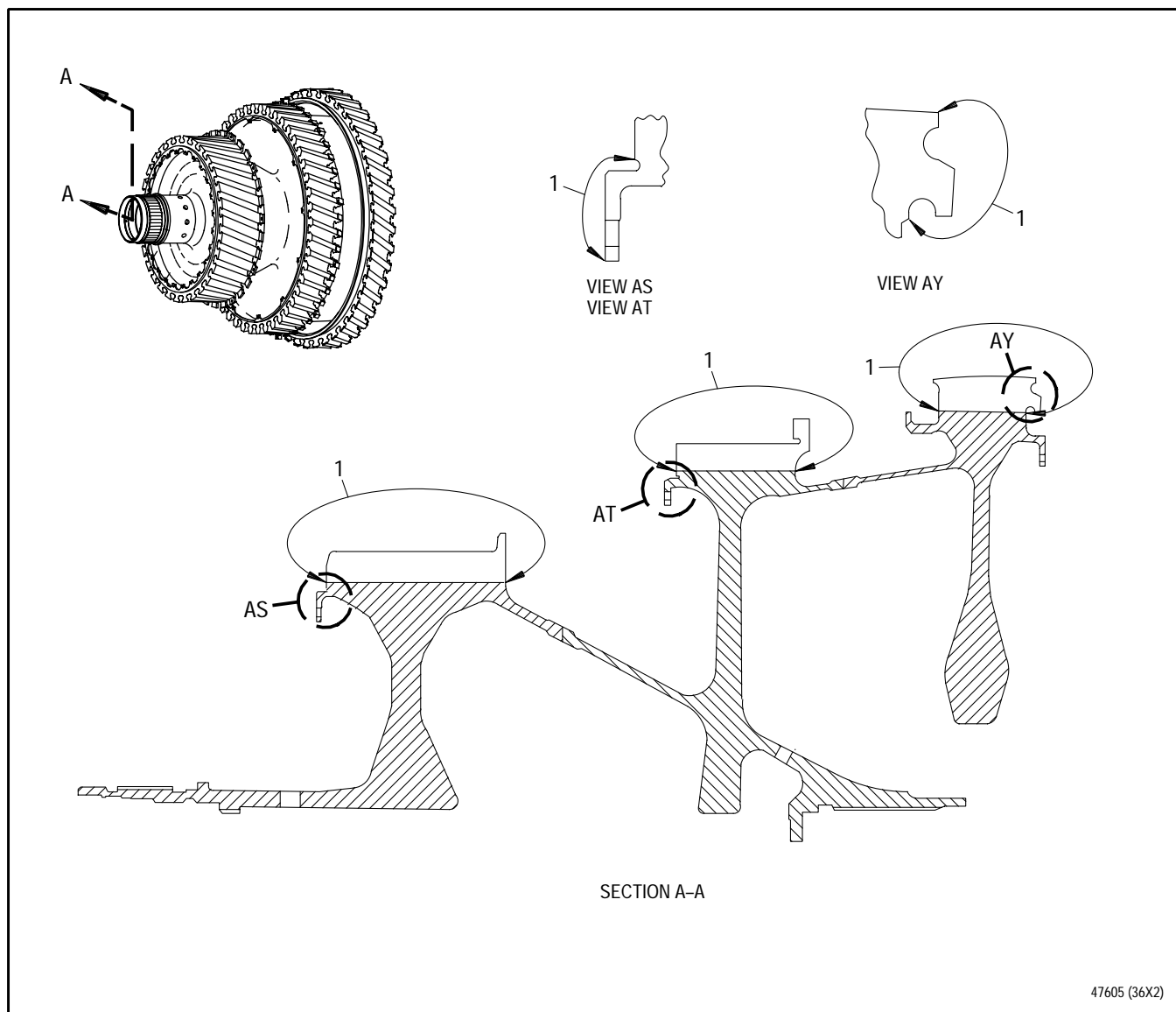


Failure to use specified masking tools could allow stripping solution to enter drum bore and damage hardface coating.

NOTE

Existing antigalling compound shall have been removed per WP 201 00 as part of inspection of blade slots for galling per WP 322 00.

- a. Ensure that masking only covers identification numbers which are on outermost OD of disk. Critical disk areas such as blade slot inner faces, snap diameter surfaces and rim front and rear faces, shall not be masked. Mask drum rotor so that identification numbers will not be obscured by antigalling compound.
- b. Apply PWA 36545 antigalling compound to areas shown in figure 10. Refer to T.O. 2-1-111, SPOP 748.



1. Apply PWA 36545 antigalling compound per text. Complete coverage required on all surfaces of slots. Overspray permissible and may be incomplete on all sides adjacent to slots.

Figure 10. Front Compressor Drum Rotor Disk Assembly - Antigalling Compound Application

**14. FRONT COMPRESSOR DRUM ROTOR DISK
ASSEMBLY - SHOTPEENING**

(See Figures 11 and 12.)

NOTE

- Each time inlet/fan module is returned to depot, blade slots in disk are to be shotpeened. Gallings or fretting of 0.003 inch maximum are to be repaired by shotpeening.
- Procedures for cleaning copper nickel residue (deposited in slots by blades) from slots are contained in this work package.
 - a. Inspect front compressor disk drum rotor per WP 322 00 and complete all repairs, including blending prior to shotpeening.
 - b. Fluorescent penetrant inspect prior to shotpeening. Refer to T.O. 2-1-111, SPOP 82.
 - c. Strip antigalling compound prior to peening, if required. Refer to T.O. 2-1-111, SPOP 18.



Failure to mask identification markings prior to shotpeening may damage markings.

- d. Mask identification markings as follows:
- (1) Part numbers
 - (2) Serial numbers
 - (3) Latest change number
 - (4) High point runout mark (small filled circle)
 - (5) ID spline marked with a triangle within a circle on OD of 3rd stage.
 - (6) Weld schedule number
 - (7) Welder and stress relief symbol
 - (8) Inspection symbols
 - (9) Detail number
 - (10) Detail serial number
 - (11) Detail heat code



Failure to use shot size as specified may cause damage to drum rotor.

- e. Run sieve test (shot size test).
Ensure shot size is SAE 170 maximum.
- f. Run one set of test strips to verify intensities at beginning of shotpeening operation as follows:
 - (1) Place PWA 71289 Almen test strip fixture on PWA 70449 stand.
 - (2) Place seven PWA 32704 test strips on PWA 71289 Almen test strip fixture to represent ID Bore and OD, 1st stage disk and web, and 1st stage slots.



Failure to use test strips and blade slots with intensities as specified will damage drum rotor disk assembly.

- (3) Ensure test strips are 4-7A intensity and blade slots are 8-11A intensities.
- g. Remove test strip fixture from stand and inspect for shot intensities using an Almen gage or equivalent. If specified intensities are not obtained, adjust nozzle and pressure and repeat until proper intensity is obtained.
- h. Place PWA 71290 test strip fixture on PWA 70449 stand.
 - (1) Place five PWA 32704 test strips on PWA 71289 Almen test strip fixture to represent 2nd stage web area, back and two tangent radii of 2nd stage blade slots.



Failure to use test strips and blade slots with intensities as specified will damage drum rotor disk assembly.

- (2) Ensure test strips are 4-7A intensity and blade slots are 8-11A intensities.
- (3) After shotpeening, remove test strip fixture from stand and inspect for shot intensities using an Almen gage or equivalent. If specified intensities are not obtained, adjust nozzle and pressure and repeat until proper intensity is obtained.
- i. Place PWA 71291 test strip fixture on PWA 70449 stand.
 - (1) Place seven PWA 32704 test strips on PWA 71289 Almen test strip fixture to represent 3rd stage disk web face rear side, 2nd and 3rd stage bore diameter, back and two tangent radii of 3rd stage blade slots,



Failure to use test strips and blade slots with intensities as specified will damage drum rotor disk assembly.

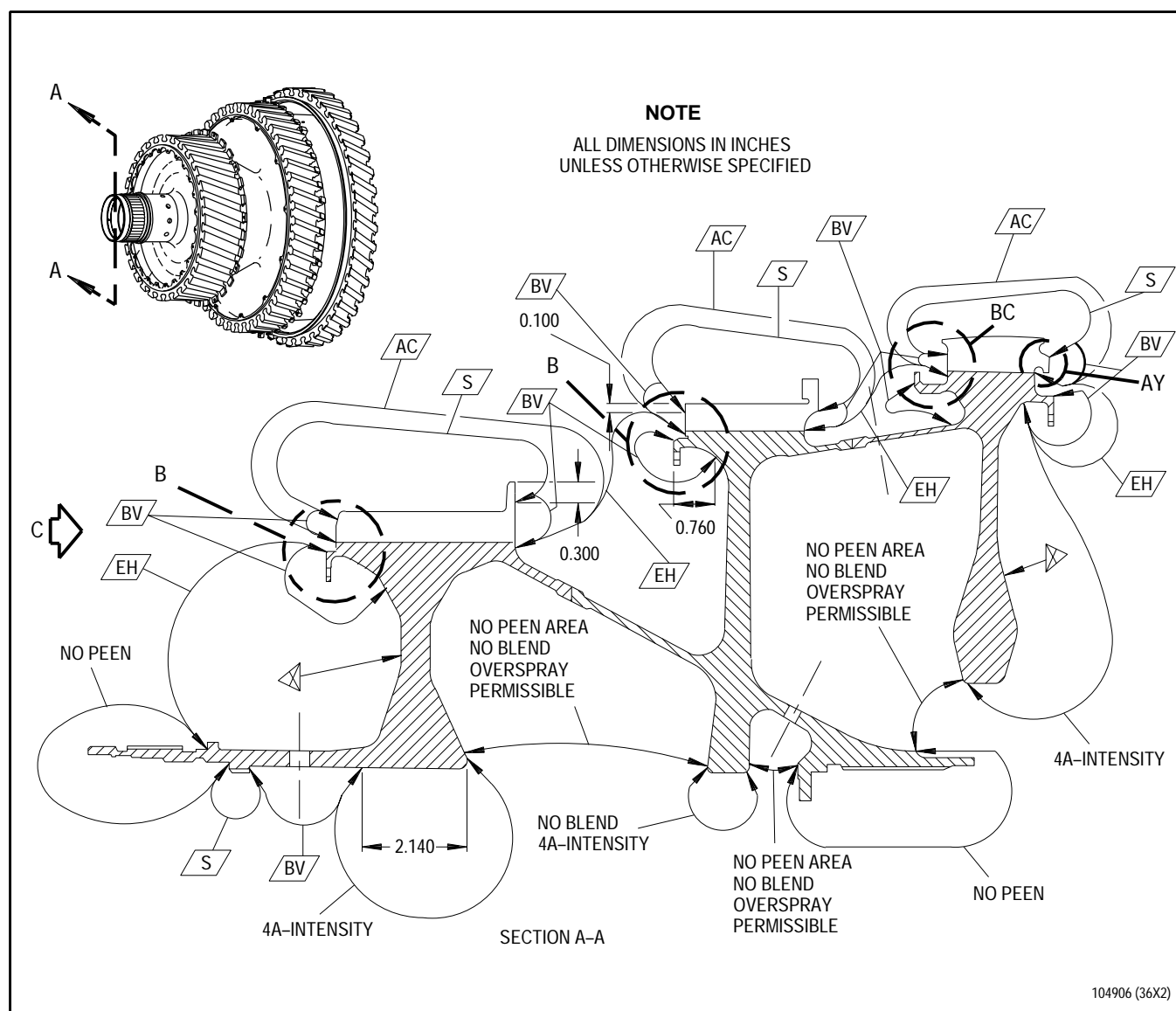
- (2) Ensure test strips are 4-7A intensity and blade slots are 8-11A intensities.
- (3) After shotpeening, remove test strip fixture from stand and inspect for shot intensities using an Almen gage or equivalent. If specified intensities are not obtained, adjust nozzle and pressure and repeat until proper intensity is obtained.

- j. Remove test strip fixture from PWA 70449 stand.
- k. Load PWA 71286 mask and PWA 71287 mask onto drum rotor disk assembly.
- l. Install masked drum rotor assembly (PN 4071223-01 or PN 4081633-01) onto PWA 71284 fixture (rear side down), using PWA 71096 lifting eye device.

NOTE

Drum rotor shall be clean, free of oil, coolant, and foreign material, prior to shotpeening.

- m. Inspect and ensure drum rotor is clean, free of oil, coolant, and foreign material, prior to shotpeening.
- n. Shotpeen all over drum rotor disk assembly with an intensity of 4A using SAE 170 maximum cast steel shot of HDNS 45 HRC MIN or equivalent. Refer to AMS 2430L. After welding or stress relief, unless otherwise specified, area EJ requires intensity of 8A. Overspray of 8A intensity is permissible in area EH, no masking is required. Minimum intensity is waived, but complete coverage required in area BV. Shotpeen is optional and may be incomplete in area S. No sharp lines of demarcation permitted, except in marking area are permitted.
- o. Turn drum rotor assembly over (forward side down). Use PWA 71292 adapter (rear lift) in vertical position to load front end onto PWA 71285 fixture. This will allow shotpeening of 3rd stage disk and bore area.
- p. Shotpeen. Refer to T.O. 2-1-111, step n., and figure 1.
- q. Remove drum rotor disk assembly from fixture.
- r. Clean media off drum rotor disk assembly and fixture by blowing off drum rotor and fixture. A magnet may be used to remove small amounts of media.
- s. Remove tape from drum rotor disk assembly. Remove all tape residue using isopropyl alcohol and cloth.
- t. Inspect and ensure drum rotor disk assembly has been shotpeened in all areas per figure 1.
- u. If only slots have been shotpeened per figure 1, inspect shotpeened area 81 per WP 322 00 inspection.
- v. No sharp lines of shotpeening demarcation permitted except in marking area.
- w. Dimensional shotpeening boundaries of areas that are shotpeened shall be -0.0 to 0.125 inches.
- x. Inspect and ensure drum rotor disk assembly identification plate is legible.
- y. Inspect drum rotor disk assembly for any damage which may have occurred by handling or during shotpeen operation.
- z. Apply antigallant per paragraph 13 to areas marked AC.



Legend for figure 11, sheet 1

1. Area EJ requires shotpeen intensity of 8A.
2. Overspray of 8A shotpeen intensity permissible in area EH, no masking required.
3. Minimum shotpeen intensity waived, but complete coverage required in area BV.
4. Shotpeen optional and may be incomplete in area S.
5. Unless otherwise specified, shotpeen per AMS 2430L all over with an intensity of 4A, using SAE 170 maximum cast steel shot, hardness HDNS 45 HRC minimum or equivalent, after welding or stress relief.
6. After shotpeen operation, apply antigallant to areas AC per paragraph 13.

Figure 11. Front Compressor Drum Rotor Disk Assembly - Shotpeening (Sheet 1 of 2)

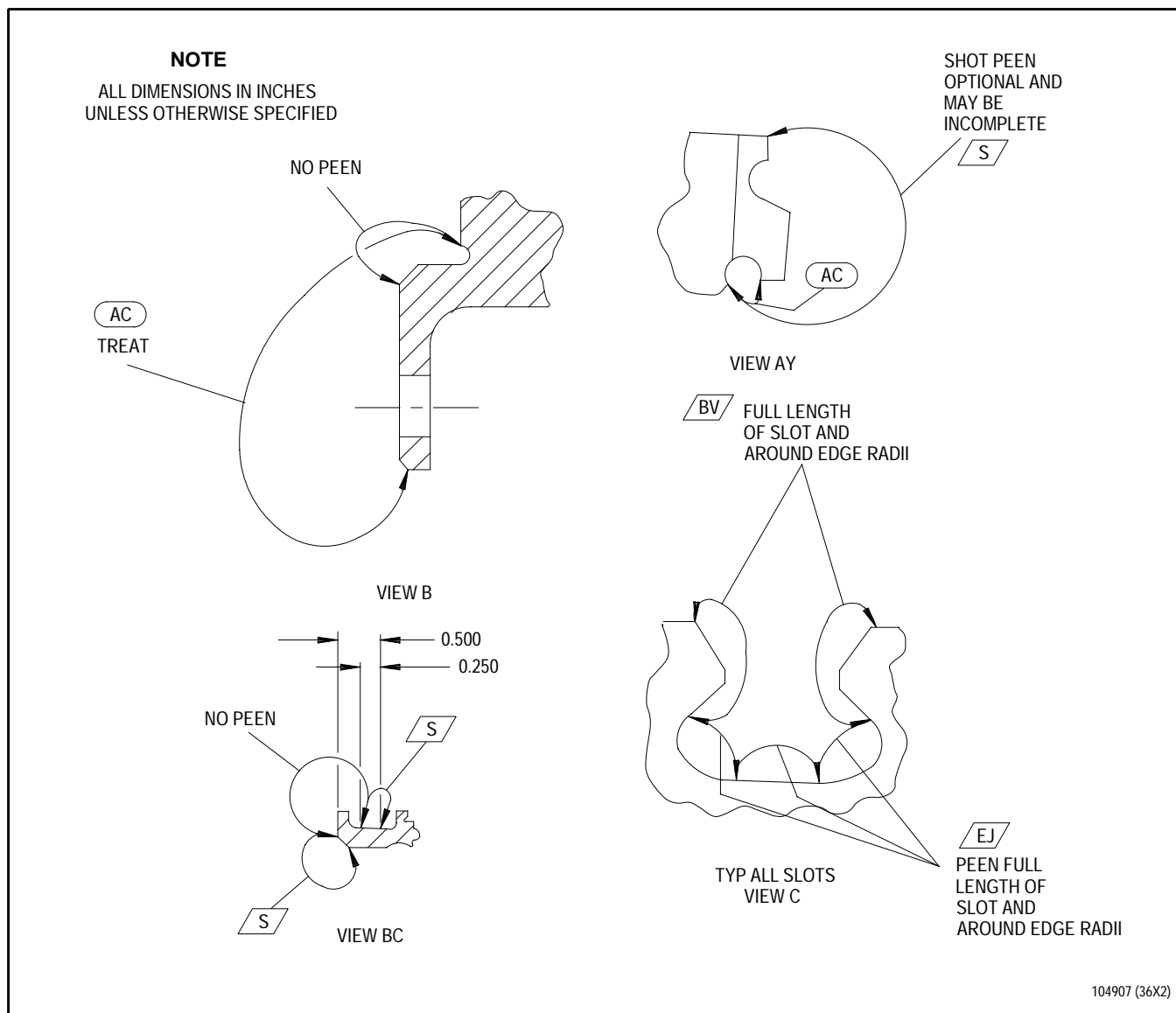


Figure 11. Front Compressor Drum Rotor Disk Assembly - Shotpeening (Sheet 2 of 2)

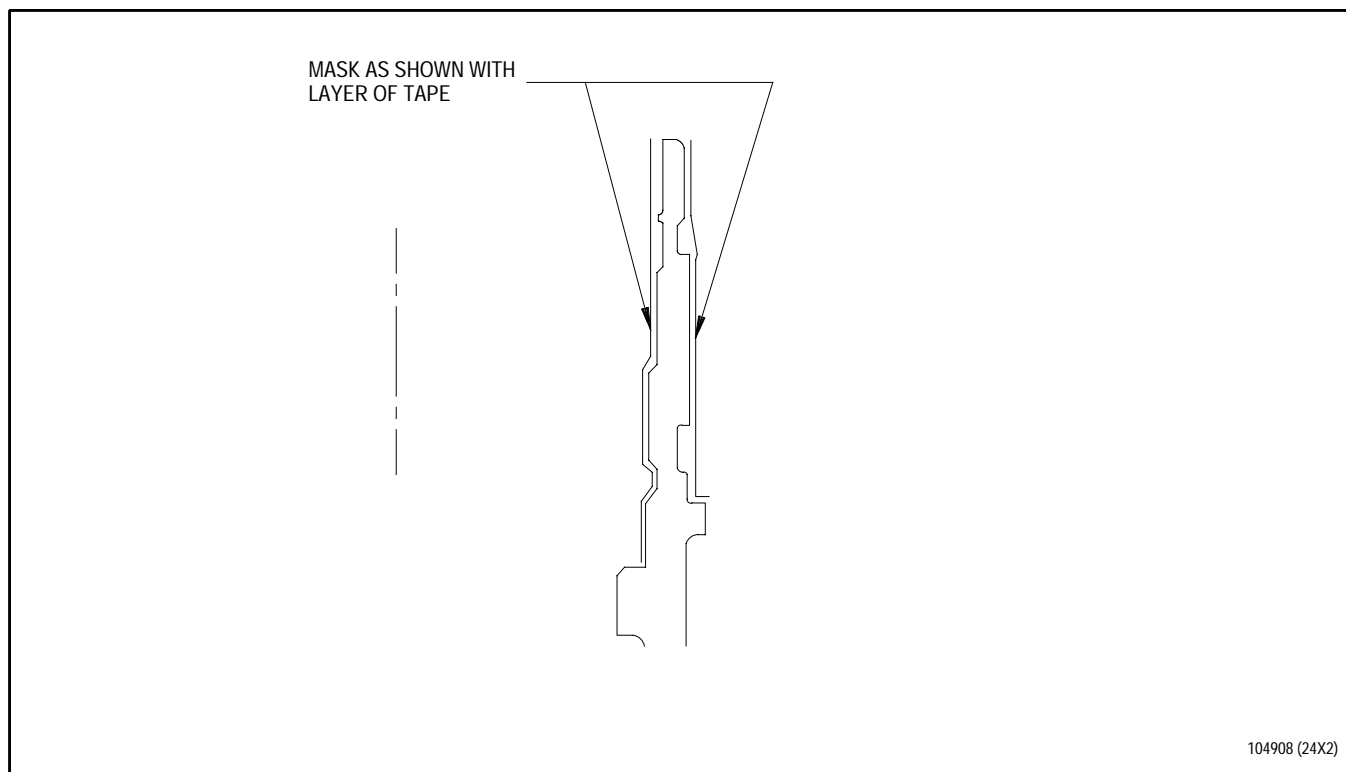


Figure 12. Masking Area (Sheet 1 of 2)

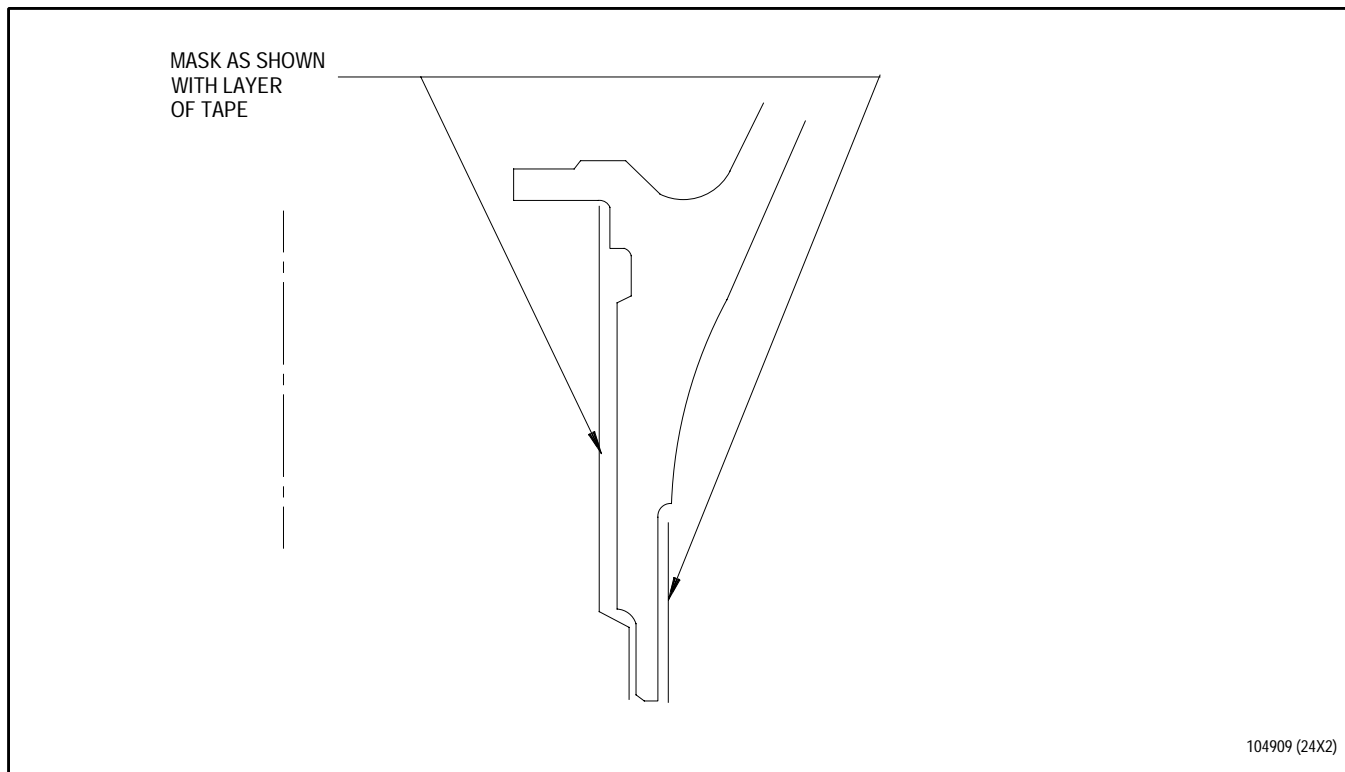


Figure 12. Masking Area (Sheet 2 of 2)

WORK PACKAGE**TECHNICAL PROCEDURES****CASE ASSEMBLY, FAN -****REPAIR****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 28

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	25	3 - 8	0	9 - 10	25
2A - 2B Added	25			11 - 26 Added	25

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Nondestructive Inspection - - - - -	T.O. 2J-F100-9
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
General Procedures - Marking, Electrochemical (SPOP 401 00) - - - - -	SWP 023 02
General Repair Procedures - Peening, Steel Shot (SPOP 501 00) - - - - -	SWP 091 08

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Adhesive/sealant, silicone rubber (PWA 36003)	RTV 157 or 159
Dry Ice (Solid CO ₂)	-
Crayon, metal marking	Colorbrite Silver No. 2101
Oil, Lubricating	MIL-L-7808

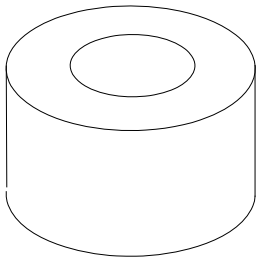
EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
Insert	MS124656	1
Insert	ST2609-01	AR
Insert	ST2609-02	AR
Insert	ST2786-01	AR
Insert	ST2786-02	AR
Insert	ST2786-06	1
Insert	ST2787-01	AR
Insert	ST2787-02	AR
Nut	4046367	1
Rivet	AN123469	2
Rivet	AMS 5737	4
Rivet	CR4622-04-04	AR
Rivet	MS9318-052	6
Rivet	MS9318-100	AR
Rivet	MS9403-132	AR
Rivet	NAS1399C4A4	AR
Rivet	NAS1399C4A5	AR
Rivet	ST1173-01	4
Rivet	ST1588-403	AR
Rivet	ST2618-404	AR
Rivet	528664	AR

APPLICABLE SUPPORT EQUIPMENT

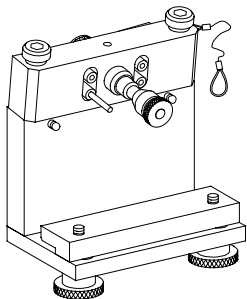
Paragraph	Function - Tool Nomenclature	Tool Number
7	FAN CASE ASSEMBLY - BORESCOPE BOSS REPLACEMENT	
	FIXTURE, DRILL, FAN CASE - - - - -	PWA 71493
8	FAN CASE ASSEMBLY - SELF-LOCKING STUD REPLACEMENT	
	DRILL BUSHING - - - - -	LM 1077
13	FAN CASE ASSEMBLY - BUSHING ASSEMBLY AND/OR INSERT REPLACEMENT	
	ADAPTER, PULLER, UNIVERSAL - - - - -	PWA 71537

ILLUSTRATED SUPPORT EQUIPMENT



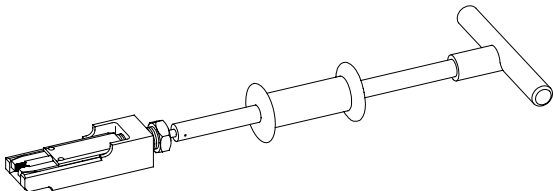
LM1077

Figure T1. LM 1077 DRILL BUSHING



PWA 71493 -C

Figure T2. PWA 71493 FIXTURE



PWA 71537 -C

Figure T3. PWA 71537 ADAPTER

1. INTRODUCTION.

- a. This work package contains instructions for repair of fan case assembly.

2. FAN CASE ASSEMBLY - BORESCOPE BOSS RIVET REPLACEMENT.

(See Figure 1.)

NOTE

This repair used for loose or damaged rivets.

- a. Carefully drill out existing rivets to prevent damage to parent material. Remove all rivet material from case.
- b. Install new rivets. Refer to T.O. 2-1-111. See figure 1.

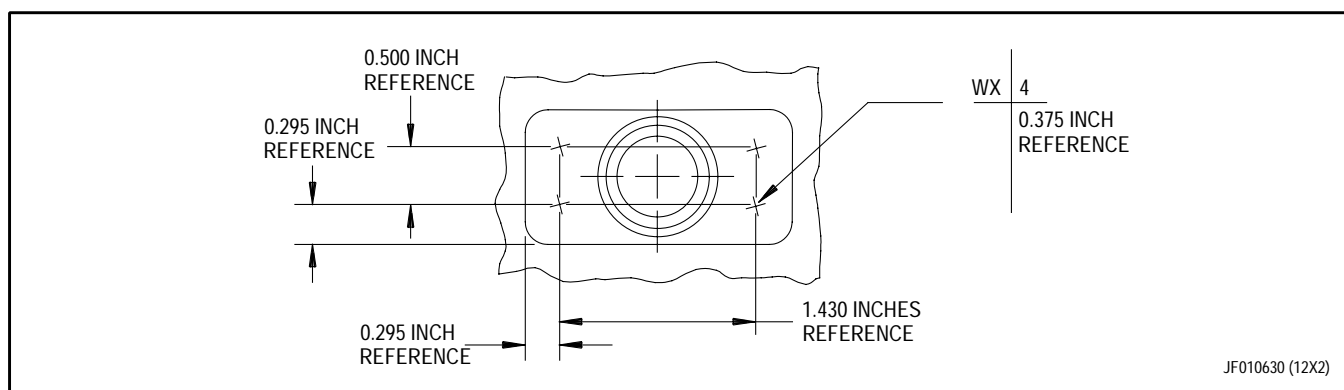


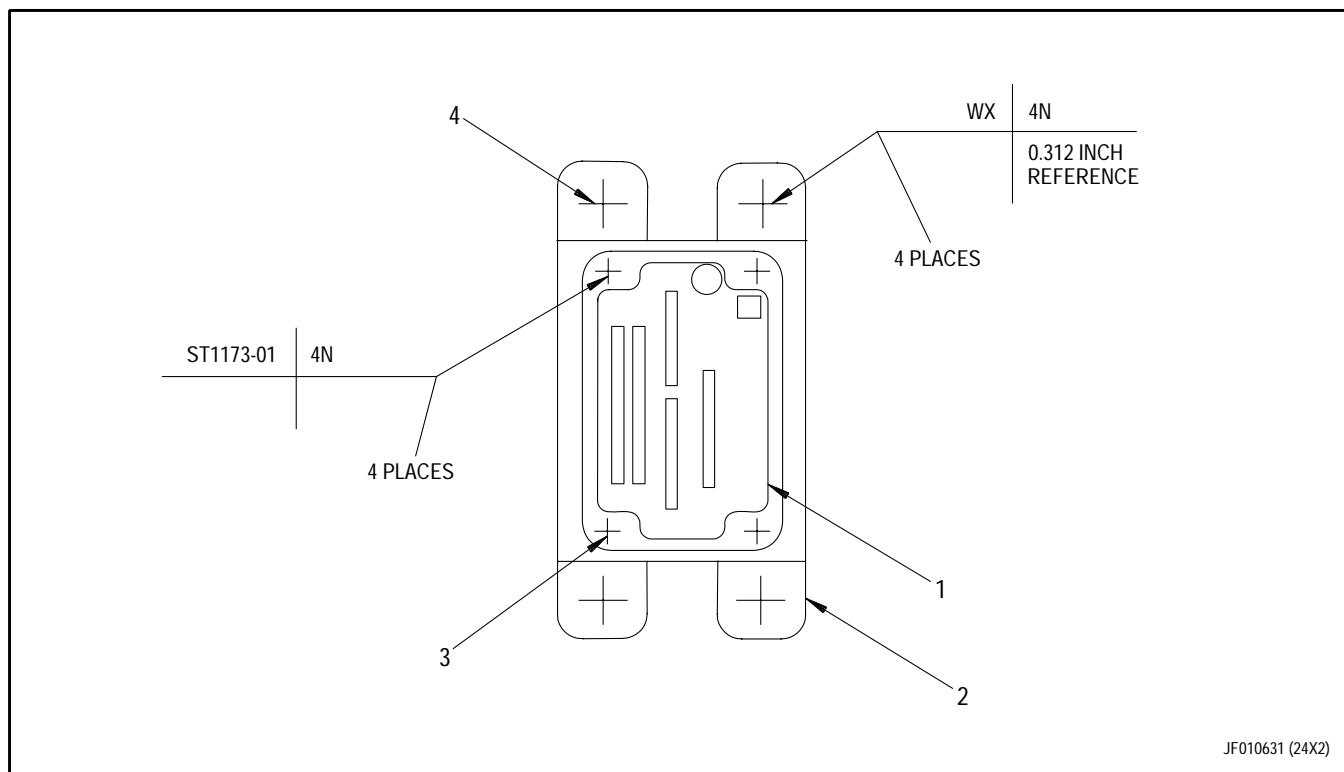
Figure 1. Fan Case Assembly - Borescope Boss Rivet Replacement

3. FAN CASE ASSEMBLY - IDENTIFICATION PLATE/BACKET REPLACEMENT.

(See Figure 2.)

NOTE

- If identification plate is missing or unserviceable, procure replacement plate and stencil information from engine records.
 - If plate(1) and bracket(2) are serviceable and are only to be transferred to a new case, four rivets(3) need to be removed.
 - Ensure entire rivet is removed from case when it is necessary to remove rivet.
- a. If bracket(2) or plate(1) is unserviceable, grind rivet heads(3) securing plate(1) to bracket(2).
 - b. If bracket(2) is unserviceable, grind rivet heads(4) securing bracket to case. If bracket(2) is serviceable do not remove from case.
 - c. Install new bracket if required. See figure 2. Rivet bracket to case. Refer to T.O. 2-1-111.
 - d. Rivet plate(1), new or original if serviceable, to bracket. Refer to T.O. 2-1-111. See figure 2.



1. Identification plate
2. Bracket
3. Blind rivet (ST1173-01) securing plate to bracket
4. Hard, solid shank rivet, AMS 5737. Cold upset heading, securing bracket to case.

Figure 2. Fan Case Assembly - Identification Plate/Bracket Replacement

4. FAN CASE ASSEMBLY - BLENDING.

(See Figure 3.)

- a. Minor damage shall be repaired by blending using fine files and/or stones. Minimum amount of material shall be removed and blend area shall be as smooth or smoother than surrounding area. Resulting blend shall be 0.015 inch maximum depth and well rounded.
- b. All blend repaired damage shall be fluorescent penetrant inspected for cracks. Refer to T.O. 2J-F100-9. No cracks allowed.

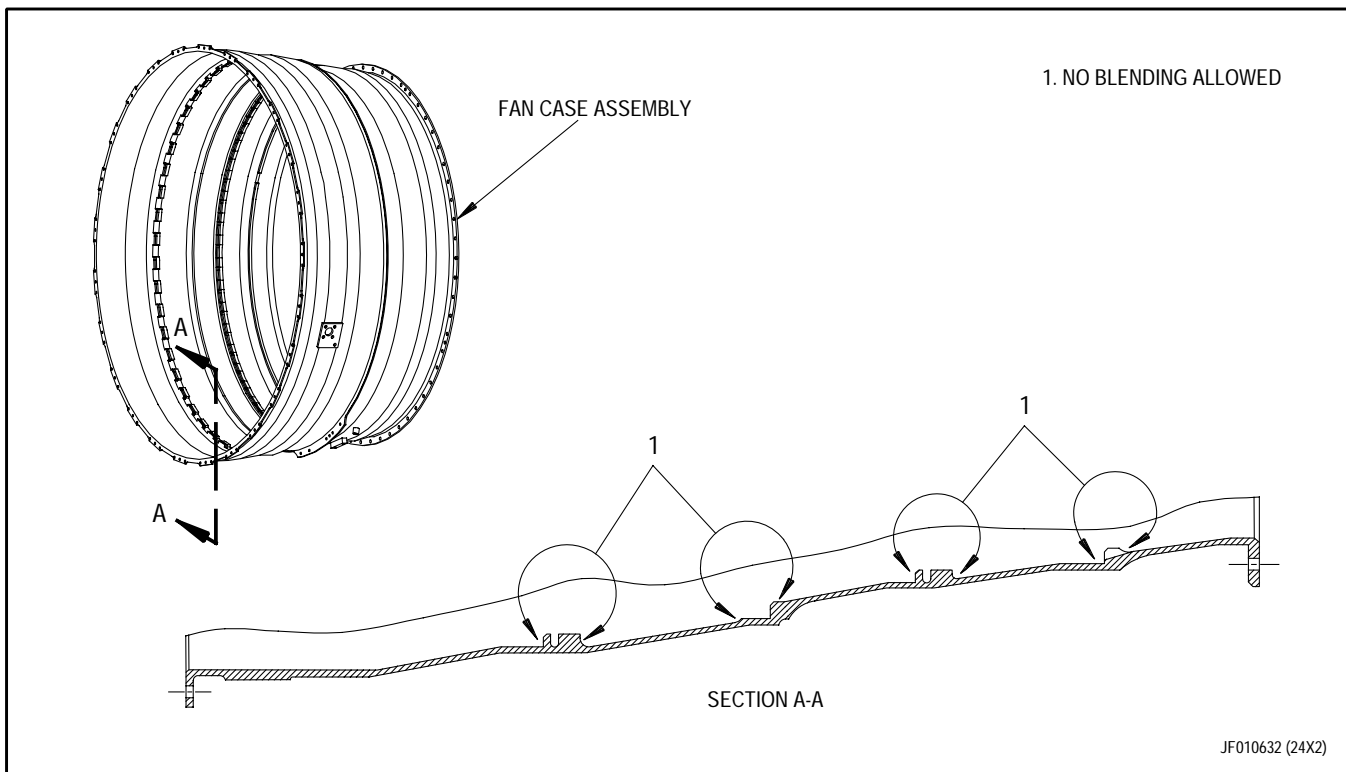


Figure 3. Fan Case Assembly - Blending

**5. FAN CASE ASSEMBLY - FRONT OUTER
FLANGE FACE REPAIR.**

(See Figure 4.)

- a. Clean-up machine to dimensions shown in figure 4.
- b. Fluorescent penetrant inspect machined areas. Refer to T.O. 2J-F100-9. No cracks allowed.
- c. Shot peen machined areas. Refer to T.O. 2J-F100-53-1, SWP 091 08. Maximum intensity, 8A.
- d. Grit blast machined areas using No. 240 to 320 silicon carbide grit at 30 to 70 psi.
- e. Apply plasma coat per PWA 53-37, to dimensions shown. Refer to T.O. 2-1-111.
- f. Finish machine to dimensions shown.
- g. Mark part with beehive symbol. Refer to T.O. 2J-F100-53-1, SWP 023 02.



Legend for figure 4

1. 16.663 to 16.675 inches to surface C.
2. 16.678 inches minimum to surface C after coat
3. Plasma spray is optional and can be incomplete.
4. Grit blast and plasma spray per steps d. and e.
5. No grit blast or plasma spray
6. 0.075 inch minimum after clean-up machine
7. 16.678 to 16.682 inches to surface C
8. Chamfer 0.030 to 0.045 inch x $45^{\circ} \pm 2^{\circ}$
9. 0.090 to 0.100 inches after final machine

6. FAN CASE ASSEMBLY - BORESCOPE BOSS SELF-LOCKING SCREW THREAD INSERT REPLACEMENT.

(See Figure 5.)



Failure to remove keys before attempting to remove insert may damage parent material.

NOTE

- Insert features hardened keys that are broached into parent material at original manufacture, providing a positive mechanical lock against vibration.
 - Cutting oil and cobalt drill bit are recommended for drilling operations.
- a. Remove self-locking screw thread insert as follows:
- (1) Hold drill perpendicular and centered. Drill a 0.594 inch diameter hole, 0.200 inch deep to remove insert material between keys.
 - (2) Deflect keys(3, figure 5) inward and break off, using a sharp point punch or equivalent.
 - (3) Remove remaining insert(4) using an E-Z out or extractor-type tool. Rotate counterclockwise to remove.
 - (4) Visually inspect hole threads for burrs, raised material and debris that would interfere with installation of new insert.
 - (5) Retap hole and remove burrs using 0.6875-12UNC-2B modified tap (minor diameter 0.640-0.645 inch).

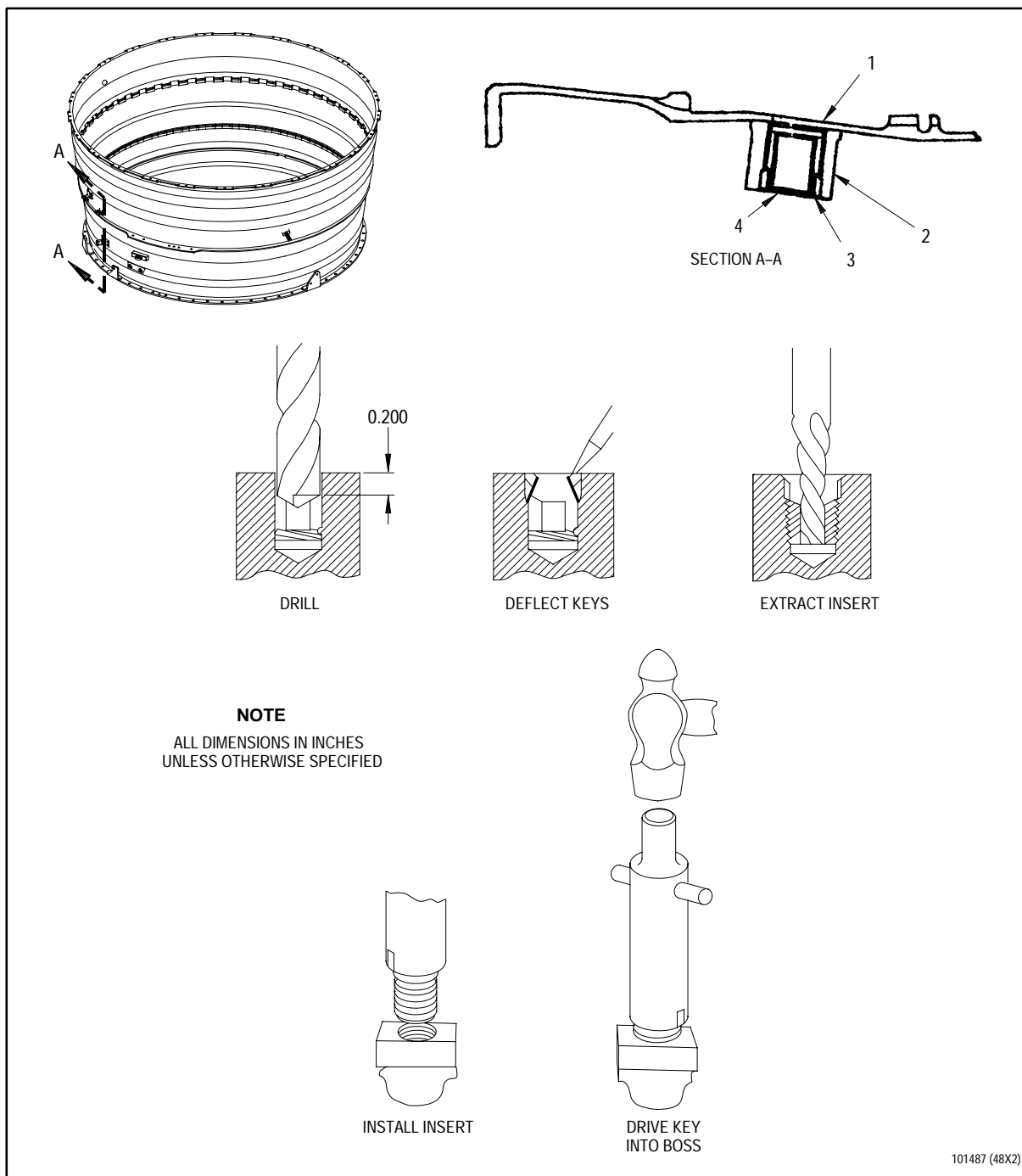
- (6) Using compressed air, blow out any debris that could interfere with installation of new insert.

b. Install insert(4) as follows:

- (1) Mark part surface using metal marking crayon where one key has broached threaded hole. Refer to T.O. 2-1-111.
- (2) Screw insert into tapped hole using appropriate tool (Tridair No. THD 820L or Microdot No. KHT 9000-8).
- (3) Align insert key with mark previously made while ensuring insert is 0.010 to 0.035 inches below part surface.
- (4) Drive keys into part until top of keys are 0.000 to 0.005 inch below part surface. If resistance is encountered while driving in keys, keys have not been properly aligned with broaches in threads. Remove and replace with new insert if this occurs.

c. Inspect insert after installation into case as follows:

- (1) Keys shall be flush or below part surface.
- (2) Keys cannot be bent or mushroomed. Replace with new insert if this occurs.



1. Fan case assembly
2. Borescope boss assembly
3. Keys
4. Borescope boss self-locking screw thread insert, ST2786-06

Figure 5. Fan Case Assembly - Borescope Boss Self-Locking Screw Thread Insert Replacement

7. FAN CASE ASSEMBLY - BORESCOPE BOSS REPLACEMENT.

(See Figure 6 and Table 1.)

NOTE

- This repair is used for borescope bosses with damaged threads.
 - Boss is secured to case with blind rivets and silicone rubber adhesive/sealant.
- a. Carefully grind off rivet head, stem and locking collar. See section D-D.
 - b. Drive rivets out with steel drift.
 - c. Remove boss and discard.
 - d. Locally remove silicone rubber adhesive/sealant from case per SPOP 254 or SPOP 704. Refer to T.O. 2-1-111.

NOTE

Replacement boss has self-locking thread insert installed.

- e. Position replacement boss per figure 6. Transfer drill rivet holes using PWA 71493 drill fixture.
- f. Apply bond to boss and case as follows:
 - (1) Roughen bonding surface of case and boss with non-metallic emery paper.
 - (2) Clean bonding surface of case and boss per PWA 83-B2. Use of isopropyl alcohol is permissible. Refer to T.O. 2-1-111.
 - (3) Bond per PWA 615 (waive PWA 104 and PWA 370). Use PWA 36003 adhesive, except cure for three hours minimum prior to handling, and waive full cure per PWA 615. Refer to T.O. 2-1-111.
 - (4) Rivet boss to fan case assembly per T.O. 2-1-111. See table 1.

Table 1. Identification of Fan Case Assembly and Corresponding Rivets

Fan Case Assembly	Rivet
4072388	MS9403-132 or 528664 or ST1588-403
4079297	528664 or ST1588-403
4079430	528664 or ST1588-403
4080064	528664 or ST1588-403

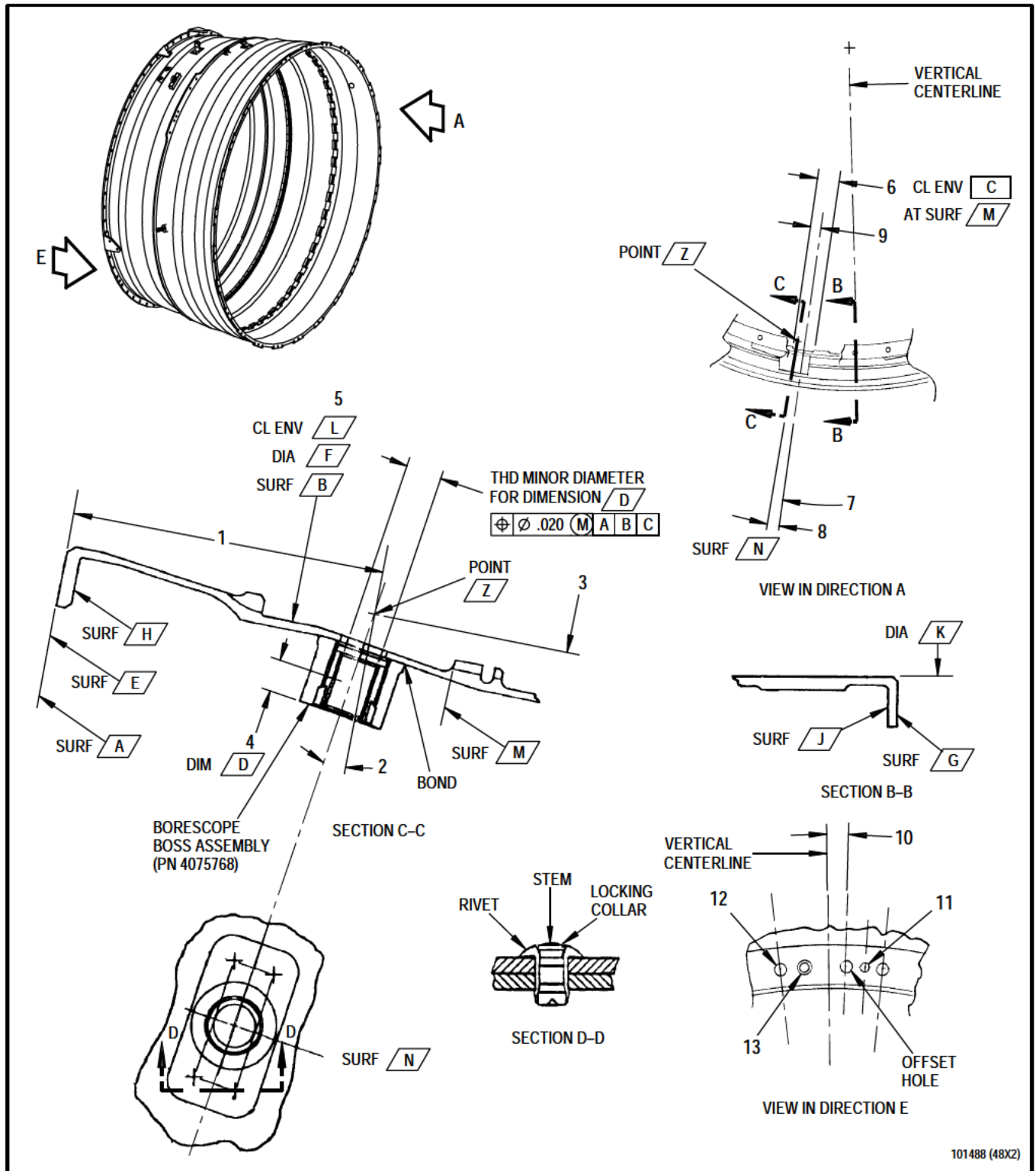


Figure 6. Fan Case Assembly - Borescope Boss Replacement

Legend for figure 6

NOTE

Unless otherwise specified all dimensions apply when Surface E is flat within 0.001 inch and Clearance Envelope L is maintained in free state or constrained. Constrain contact allowed on Surfaces E, G, H, and J, and Diameters K and F.

1. 3.705 inches
2. 7° 44'
3. 32.104 inches diameter
4. 0.365 to 0.385 inches
5. 32.637 inches diameter clearance envelope relative to Surface A
6. 1.134 inches clearance envelope relative to Surface A
7. 189° 18' 36"
8. 1° 26' 24"
9. 0.631 inch
10. 1° 30'
11. 0.129 to 0.132 inch diameter (5 holes reference)
12. 0.276 to 0.286 inch diameter (60 holes, 1 offset reference)
13. 0.250 to 0.280UNF-2B, 4 places reference

8. FAN CASE ASSEMBLY - SELF-LOCKING STUD REPLACEMENT.

(See Figure 7.)

NOTE

Stud features hardened keys that are broached into parent material at original manufacture, providing a positive mechanical lock against vibration.

a. Remove self-locking stud as follows:

- (1) Cut off nut end of stud 0.250 inch above case surface. Discard removed portion of stud.
- (2) Locate center of stud using LM 1077 drill bushing.



Failure to remove keys before attempting to remove insert may damage parent material.

NOTE

Cutting oil and cobalt drill bit are recommended for drilling operations.

- (3) Hold drill perpendicular and centered. Drill a 0.089 inch diameter pilot hole, 0.250 inch deep in stud.
- (4) Remove remaining stud material as follows:
 - (a) Center a 0.189 inch diameter drill bit with pilot hole.
 - (b) Drill to a depth of 0.125 inch to remove material between stud keys.
 - (c) Deflect keys inward and break off using a sharp point punch or equivalent.

(d) Remove stud remains with E-Z out or extractor-type tool. Rotate counterclockwise to remove.

- (5) Visually inspect hole threads for burrs, raised material and debris that would interfere with installation of new stud.
- (6) Retap hole to remove burrs using 0.250-28UNJF-3B modified tap (minor diameter 0.2152-0.2245 inch, minor diameter depth 0.480 inch maximum).
- (7) Using compressed air, blow out any debris that could interfere with installation of new stud.

b. Install stud as follows:

- (1) Mark location on part surface, using metal marking crayon, where one key has broached threaded hole. Refer to T.O. 2-1-111.
- (2) Screw stud into tapped hole using Tridair No. TR28009-18-200 or equivalent.
- (3) Align stud key with mark previously made while ensuring stud end thread is flush or below part surface.
- (4) Drive keys into part by tapping on stud driver until top of keys are 0.000 to 0.030 inch below case surface. If resistance is encountered while driving in keys, keys have not been properly aligned with thread broaches. Remove stud and replace with new stud if this occurs.

c. Inspect stud as follows:

- (1) Keys shall be flush or below part surface.
- (2) Keys cannot be bent or mushroomed. Replace with new stud if this occurs.

- (3) Ensure threads are not damaged. If keys or stud are damaged, replace with new stud.

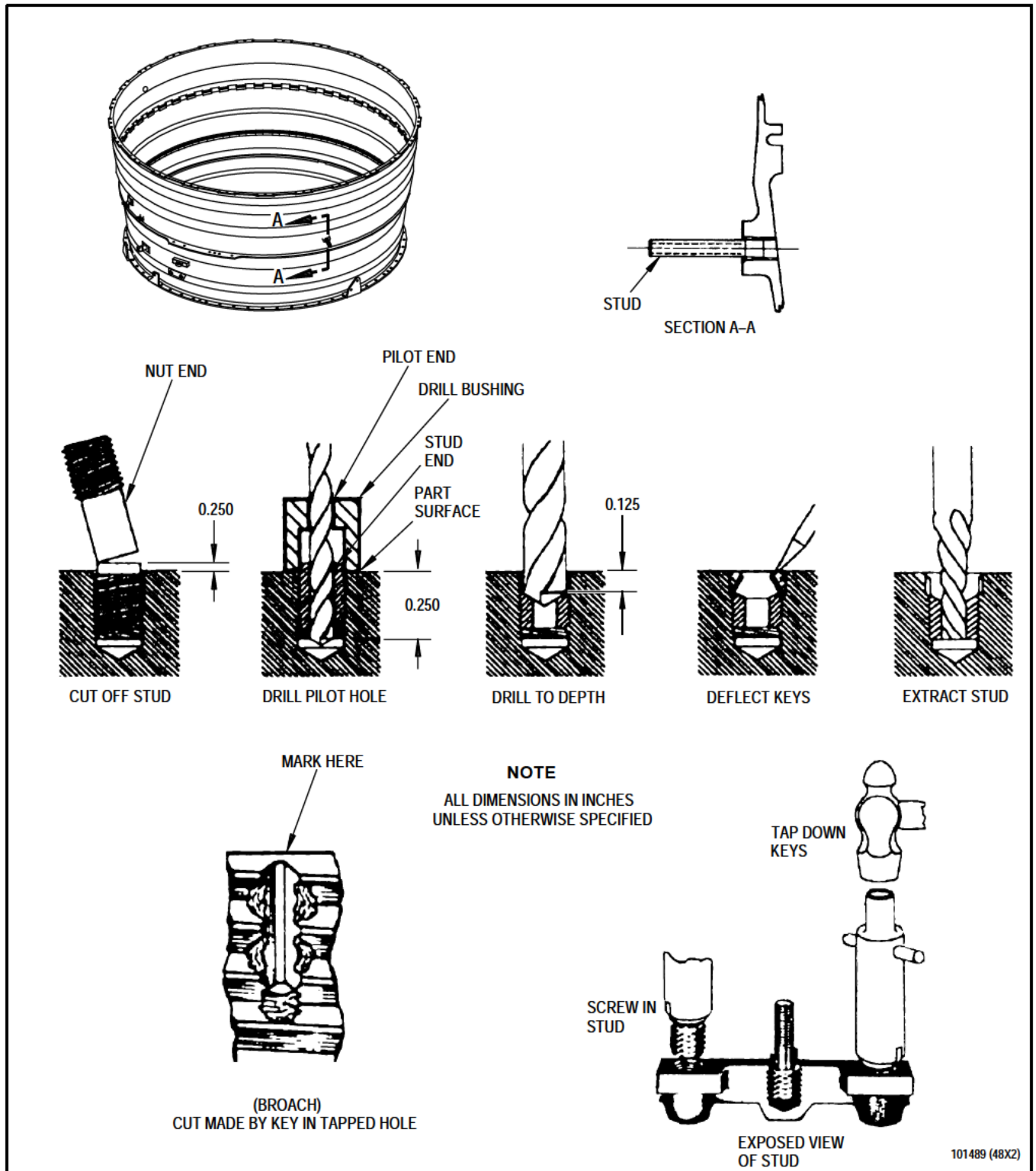


Figure 7. Fan Case Assembly - Self-Locking Stud Replacement

9. FAN CASE ASSEMBLY - SELF-LOCKING SCREW THREAD INSERT REPLACEMENT.

(See Figure 8.)



Failure to remove keys before attempting to remove insert may damage parent material.

NOTE

- Insert features hardened keys that are broached into parent material at original manufacture, providing a positive mechanical lock against vibration.
- Cutting oil and cobalt drill bit are recommended for drilling operations.

a. Remove self-locking screw thread insert as follows:

- (1) Hold drill perpendicular and centered. For insert(1, figure 8), drill a 0.281 inch diameter hole, 0.160 inch deep. For insert(2), drill a 0.343 inch diameter hole, 0.190 inch deep.
- (2) Deflect keys inward and break off using a sharp point punch or equivalent.
- (3) Remove remaining insert using an E-Z out or extractor-type tool. Rotate counterclockwise to remove.
- (4) Visually inspect insert thread hole for burrs, raised material and debris that would interfere with installation of new insert.
- (5) Retap hole and remove burrs using 0.375-16UNC-2B modified tap (0.331-0.336 inch minor diameter for insert(1)); and 0.4375-14UNC-2B modified tap (0.396-0.401 inch minor diameter for insert(2)).

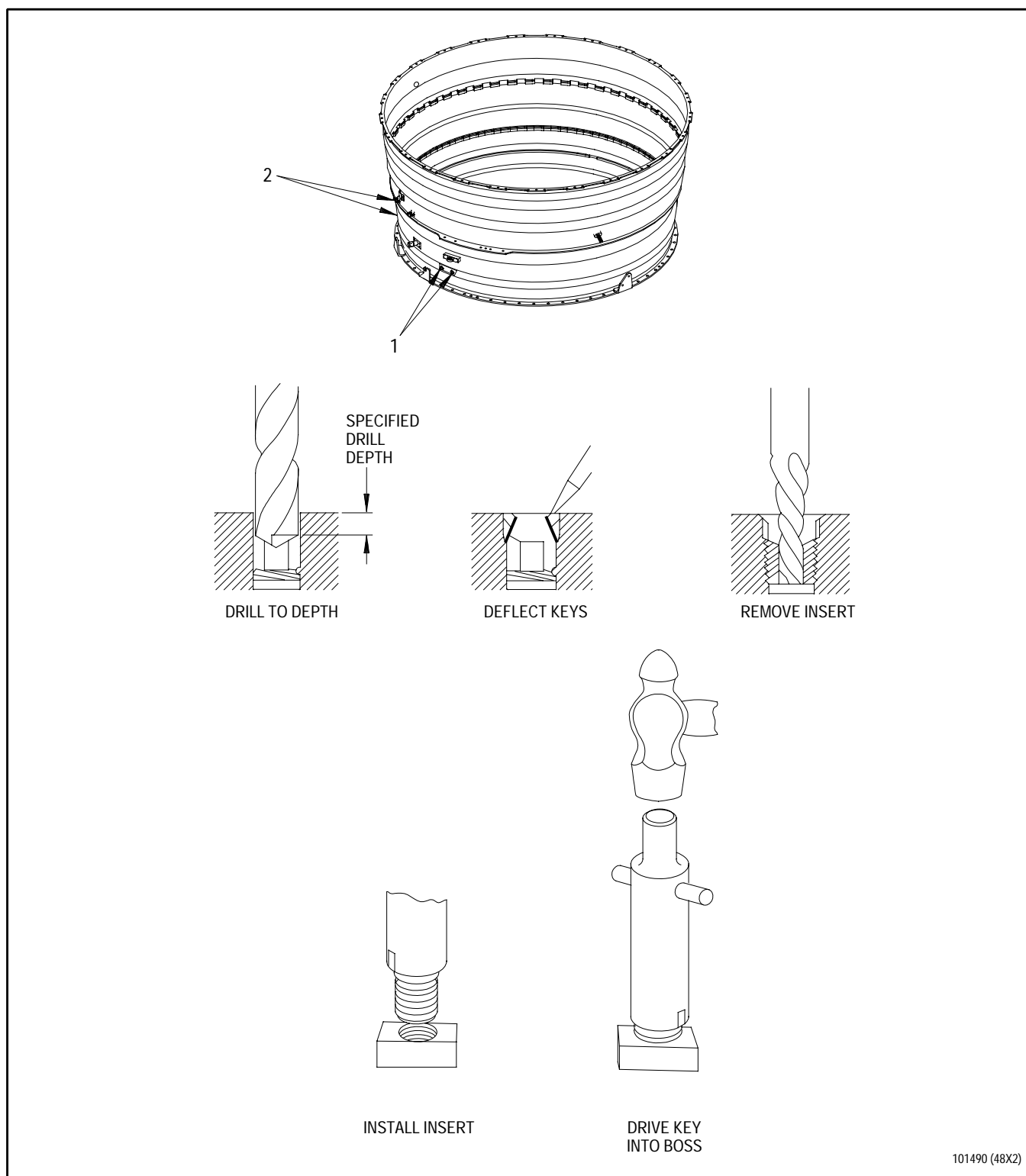
- (6) Using compressed air, blow out any debris that could interfere with installation of new insert.

b. Install insert as follows:

- (1) Mark part surface using metal marking crayon where one key has broached threaded hole. Refer to T.O. 2-1-111.
- (2) Screw insert(1) into tapped hole using Tridair No. THD 1032L or Microdot No. KHT 9000-3. Screw insert(2) into tapped hole using Tridair No. THD 428L or Microdot No. KHT 9000-4.
- (3) Align insert key with mark previously made while ensuring insert is 0.010 to 0.035 inch below part surface.
- (4) Drive keys into part until top of keys are 0.000 to 0.005 inch below part surface. If resistance is encountered while driving in keys, keys have not been properly aligned with broaches in threads. Remove insert and replace with new insert if this occurs.

c. Inspect insert after installation into case as follows:

- (1) Keys shall be flush or below part surface.
- (2) Keys cannot be bent or mushroomed. Replace with new insert if this occurs.



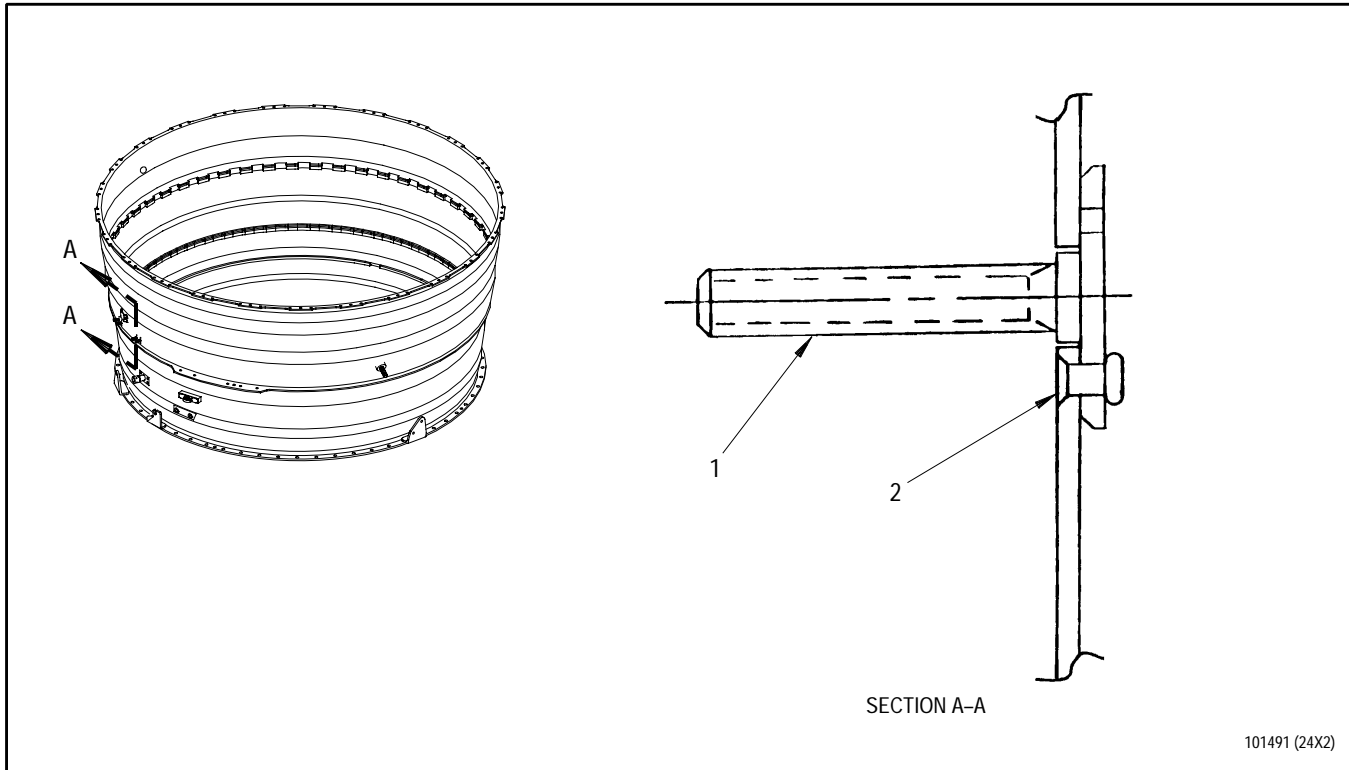
1. Self-locking screw thread insert (PN ST2786-01, ST2787-01, or ST2609-01)
2. Self-locking screw thread insert (PN ST2786-02, ST2787-02, or ST2609-02)

Figure 8. Fan Case Assembly - Self-Locking Screw Thread Insert Replacement

10. FAN CASE ASSEMBLY - ANCHOR BOLT REPLACEMENT.

(See Figure 9.)

- a. Remove rivets(2) by grinding off upset head and driving rivet out with a steel drift. Refer to T.O. 2-1-111.
- b. Remove bolt(1).
- c. Discard rivets and bolt.
- d. Rivet bolt to case. Gap requirements waived. Refer to T.O. 2-1-111.



1. Bolt (ST2137-01)
2. Rivet (MS9318-052)

Figure 9. Fan Case Assembly - Anchor Bolt Replacement

11. FAN CASE ASSEMBLY - BRACKET REPLACEMENT.

(See Figure 10 and Table 2.)

- a. Remove rivets by grinding off upset head and driving rivet out with a steel drift. Refer to T.O. 2-1-111.
- b. Remove bracket.
- c. Discard rivets and bracket.
- d. Rivet new bracket to case per T.O. 2-1-111. Gap requirements waived. See table 2.

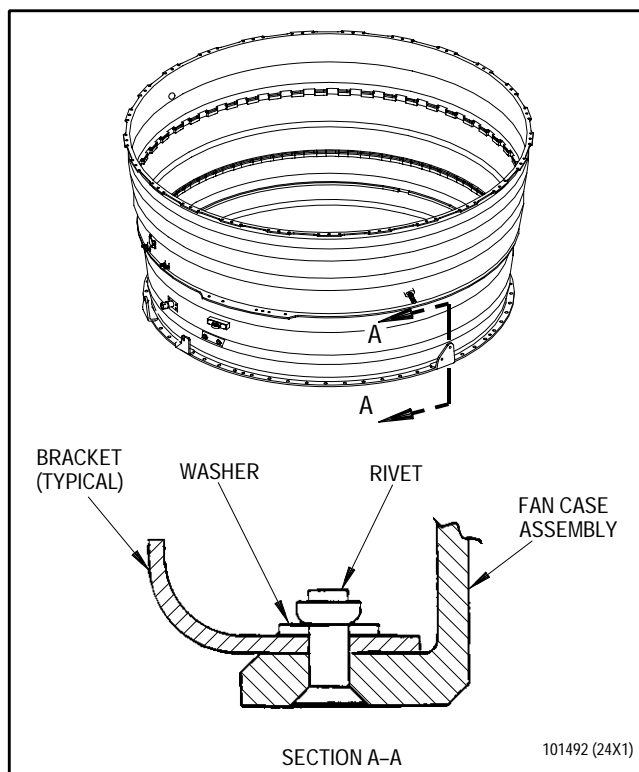


Figure 10. Fan Case Assembly - Bracket Replacement

**Table 2. Identification of Fan Case Assembly and Corresponding
Bracket Hardware Part Numbers**

Fan Case Assembly	Bracket	Rivet	Washer
4072388	4072170 4075784 4072708 4075782	MS9318-100	
4079297	4072170 4075784 4072708 4075782	NAS1399C4A4 or NAS1399C4A5	MS9321-05
4079430	4072170 4075784 4072708 4075782	NAS1399C4A4 or NAS1399C4A5	
4080064	4072170 4075784 4072708 4075782	NAS1399C4A4 or NAS1399C4A5	MS9321-05
4080063	4069409 4069408 4069405 4069406	NAS1399C4A4 or NAS1399C4A5	

12. FAN CASE ASSEMBLY - BRACKET ASSEMBLY AND/OR NUT REPLACEMENT.

(See Figure 11 and Table 3.)

- a. Remove rivet securing bracket assembly to case by grinding off upset head and driving rivet out with a steel drift. Refer to T.O. 2-1-111.
- b. Remove bracket assembly.
- c. If replacing nut, continue to step d. If replacing bracket assembly, continue to step g.
- d. Remove rivets that secure nut to bracket by grinding off upset head and driving rivet out with a steel drift. Refer to T.O. 2-1-111.
- e. Discard rivets and nut.
- f. Rivet nut, PN 4046367, to bracket using rivet, AN123469, and continue to step h. Refer to T.O. 2-1-111.
- g. Discard bracket assembly and rivet.
- h. Rivet new bracket assembly to fan case assembly per T.O. 2-1-111. See table 3.

Table 3. Identification of Fan Case Assembly and Corresponding Bracket Assembly Hardware Part Numbers

Fan Case Assembly	Bracket Assembly	Rivet
4072388	4075785	MS9318-100 or NAS1399C4A4 or NAS1399C4A5 or ST2618-404
4079297	4075785	NAS1399C4A4 or NAS1399C4A5 or ST2618-404
4079430	4075785	NAS1399C4A4 or NAS1399C4A5 or ST2618-404
4080064	4075785	NAS1399C4A4 or NAS1399C4A5 or ST2618-404
4080063	4069410	CR4622-04-04 or NAS1399C4A4 or NAS1399C4A5

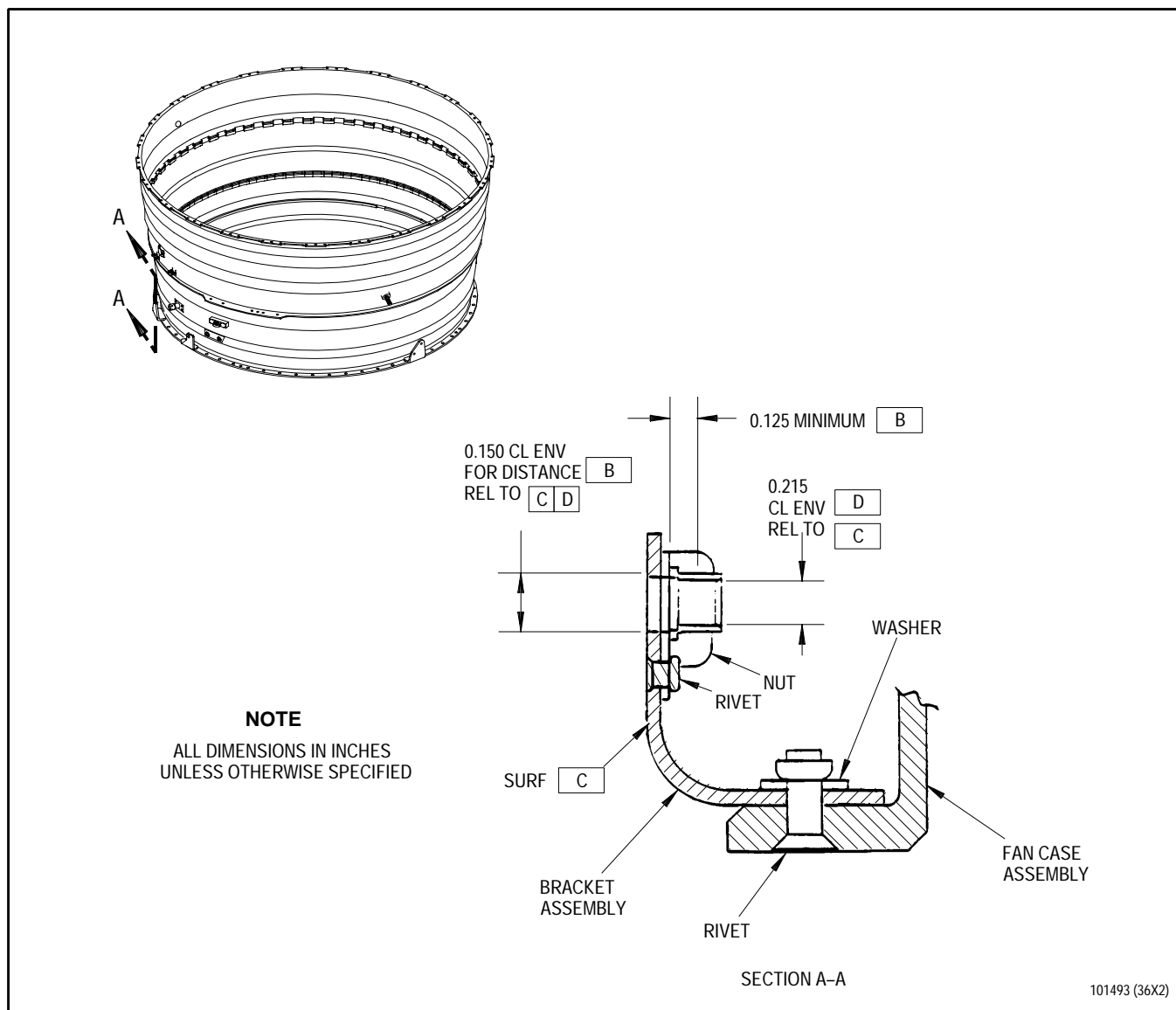


Figure 11. Fan Case Assembly - Bracket Assembly and/or Nut Replacement

13. FAN CASE ASSEMBLY - BUSHING ASSEMBLY AND/OR INSERT REPLACEMENT.

(See Figure 12.)

- a. If replacing insert only, continue to step b. If replacing bushing assembly, continue to step c.
- b. Replace helicoil insert as follows:
 - (1) Insert Heli-Coil PN 1227-6 or equivalent into insert.
 - (2) Strike head of tool slightly.
 - (3) Turn tool counterclockwise maintaining a steady downward pressure. Remove and discard insert.
 - (4) Retap hole (0.250-28) using Heli-Coil PN 4FPB tap or equivalent.
 - (5) Install replacement insert, MS124656, using Heli-Coil PN 7552-4 or equivalent. Ensure top face of first coil is 0.5 to 1.0 pitch below boss surface.
 - (6) Remove insert driving tang using Heli-Coil PN 3695-4 or equivalent.
- c. Replace bushing assembly as follows:
 - (1) With appropriate tooling, grind or cut staked edge of bushing. Use care not to damage case.
 - (2) Using steel drift or arbor press, remove bushing and discard.
 - (3) Clean bushing hole in case. Refer to T.O. 2-1-111, SPOP 208, Method A.
 - (4) Measure case hole diameter. Dimensions must be within 0.439 to 0.441 inch.
 - (5) Coat bushing surface lightly with lubricating oil.
 - (6) Chill bushing in dry ice for minimum of 10 minutes.
 - (7) Install chilled bushing assembly into hole in case.
 - (8) Groove stake bushing assembly 360 degrees, after bushing has warmed to room temperature, using PWA 71537 puller adapter. Refer to T.O. 2-1-111.

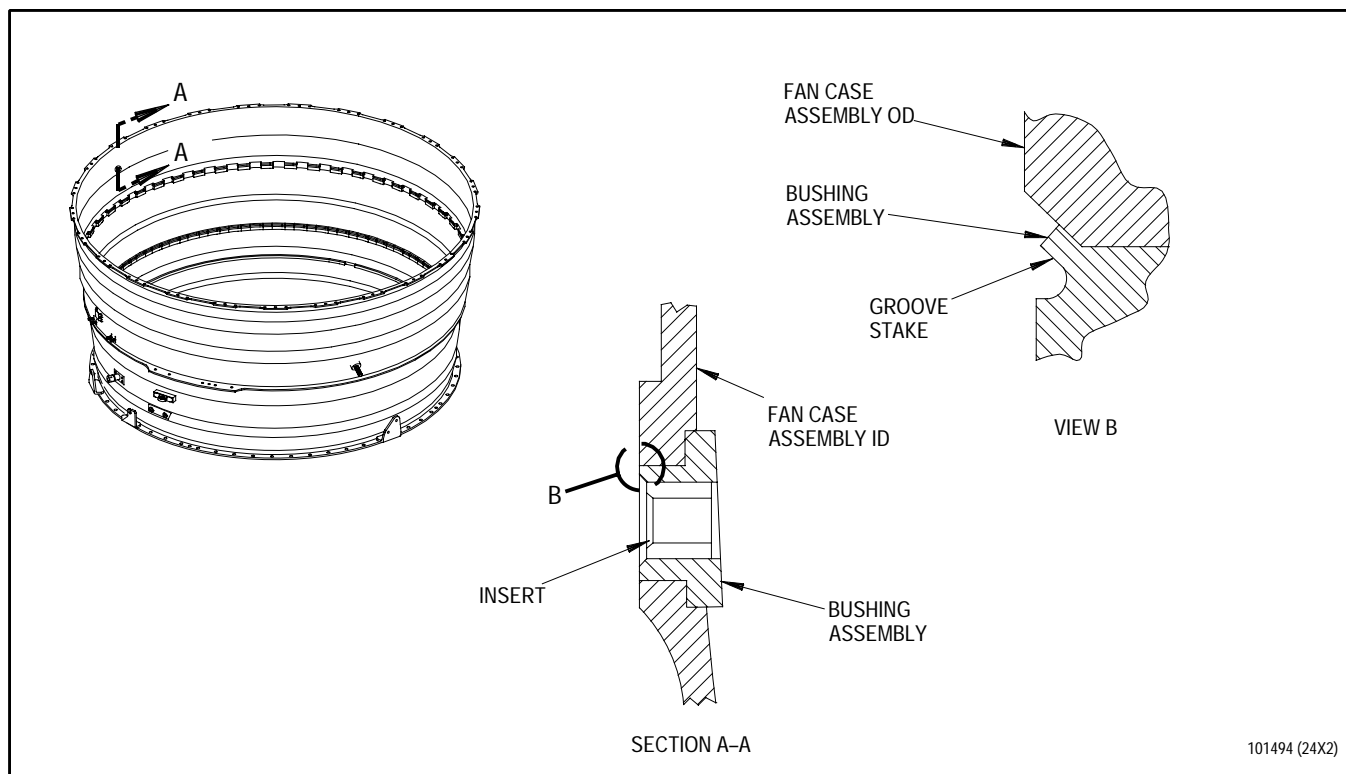


Figure 12. Fan Case Assembly - Bushing Assembly and/or Insert Replacement

WORK PACKAGE

TECHNICAL PROCEDURES

SUPPORT, FRONT COMPRESSOR STATOR, BELL CRANK, INLET -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 5	0	6	Blank	0	

T.O. 2J-F100-53-6

WP 425 00

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature

Specification/Vendor Part Number

Compound, antigalling
(PWA 36545)

Everlube 382

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for repair of inlet front compressor stator bellcrank support.

2. INLET FRONT COMPRESSOR STATOR BELLCRANK SUPPORT - REPAIR.

(See Figure 1.)

- a. Repair oversize outer holes as follows:

- (1) Machine worn hole to diameter(1).

- (2) Measure diameter(1).

- (3) Locally manufacture sleeve using AMS 5744 tube or bar stock material.
See figure 1.

- (a) Machine OD of sleeve to 0.0002 to 0.0017 inch tight fit, measured diameter(1).

- (b) ID of sleeve to be 0.363 to 0.373 inch diameter.

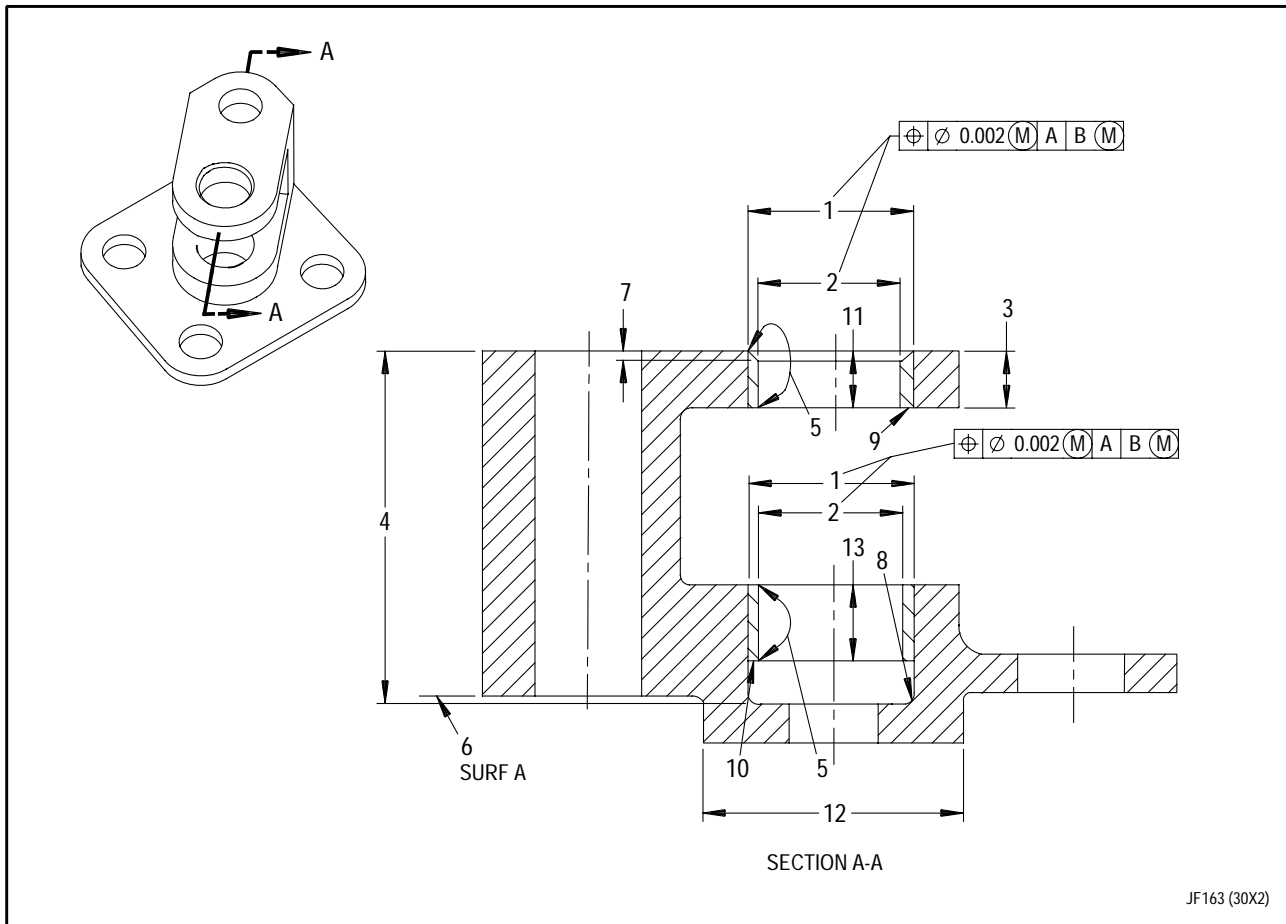
- (4) Chill sleeve.

- (5) Install sleeve in outer hole, flush to 0.002 inch below inner surface.

- (6) Machine sleeve flush to 0.002 inch above outer surface.

- (7) Finish machine sleeve to dimensions shown in figure 1.

- (8) Apply PWA 36545 antigalling compound to machined area.
See figure 1.



- | | |
|-----------------------------------------------------------------------------------|-------------------------------------------------|
| 1. 0.430 to 0.440 inch diameter finish machined. | 7. Chamfer 0.015 to 0.025 inch by 45° 2'. |
| 2. 0.3750 to 0.3765 inch diameter, finish machined. | 8. 0.010 to 0.030 inch radius, finish machined. |
| 3. 0.140 inch minimum | 9. Outer sleeve |
| 4. 0.920 to 0.930 inch | 10. Inner sleeve |
| 5. Antigalling compound area. See text. Other areas optional and may be complete. | 11. 0.150 to 0.160 inch, dimension for sleeve. |
| 6. Surface A. | 12. Diameter B, 0.7468 to 0.7483 inch. |
| | 13. 0.197 to 0.207 inch, dimension for sleeve. |

Figure 1. Inlet Front Compressor Stator Bellcrank Support - Repair

b. Repair oversize inner hole or inner and outer holes as follows:

- (1) Machine worn holes to diameter(1) and depth(4).
- (2) Measure diameter(1) at both inner and outer holes as required.
- (3) Locally manufacture sleeves using AMS 5744 tube or bar stock material.
See figure 1.
 - (a) Machine OD of sleeves to 0.0002 to 0.0017 inch tight fit, measured diameter(1).
 - (b) ID of sleeve to be 0.363 to 0.373 inch diameter.
- (4) Chill sleeves.

- (5) Install sleeve in inner hole flush to 0.002 inch below surface.
- (6) Install sleeve in outer hole flush to 0.002 inch below inner surface.
- (7) Machine outer hole sleeve flush to 0.002 inch above outer surface.
- (8) Finish machine sleeves to dimensions shown in figure 1.
- (9) Apply PWA 36545 antigalling compound to machined area.
See figure 1.

3. FOLLOW-ON MAINTENANCE.

- a. Install bellcrank support per WP 704 00.

WORK PACKAGE

TECHNICAL PROCEDURES

BELL CRANK ASSEMBLY, FRONT COMPRESSOR STATOR LINKAGE, INLET -

REPAIR

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	30	6	28	7 - 9	22
3 - 5	22			10 Blank	22

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
CLOTH, CROCUS	P-C-458
ISOPROPYL ALCOHOL	TT-I-735
OIL, ENGINE	MIL-L-6081

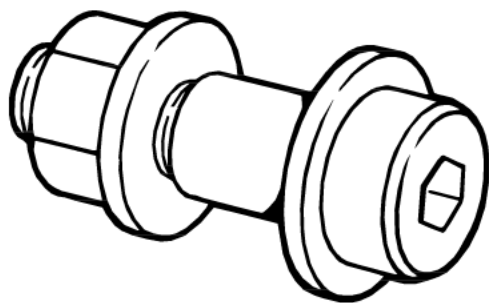
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

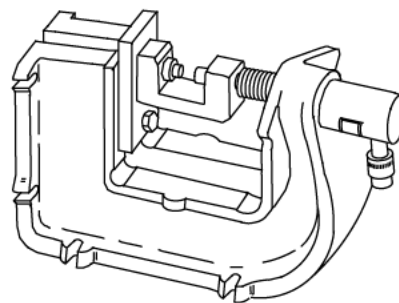
Paragraph	Function - Tool Nomenclature	Tool Number
2	Inlet Front Compressor Stator Linkage Bell Crank Assembly - Bushing Replacement	
	Pump, Hydraulic hand - - - - -	PWA 55380
		AND
	Puller, Gearbox housing assembly mount lug bushing disassembly and assembly - - - - -	PWA 70109
	Drift - - - - -	OR
		LM 1085
		AND
	Pusher - - - - -	LM 1086
		OR
	Puller, Compressor Intermediate Case Bushings - - - - -	PWA 50719
3	Inlet Front Compressor Stator Linkage Bell Crank Assembly - Self-Aligning Bearing Replacement	
	Puller, Self-Aligning Bearing	PWA 56662
	Fixture, Staking, Spherical Bearing	PWA 55320
	Anvil, Staking Set, Front Compressor Stator Synchronizing Ring Bellcrank Bearing (0.250 ID)	PWA 57198
	Pump, Hydraulic hand	PWA 55380

ILLUSTRATED SUPPORT EQUIPMENT



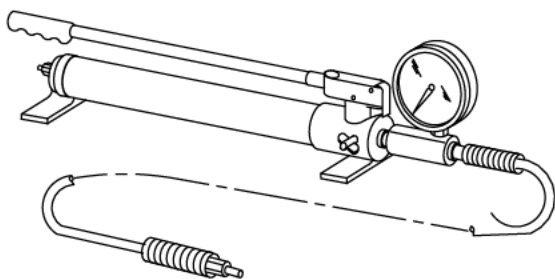
PWA 50719 -C

Figure T1. PWA 50719 Puller



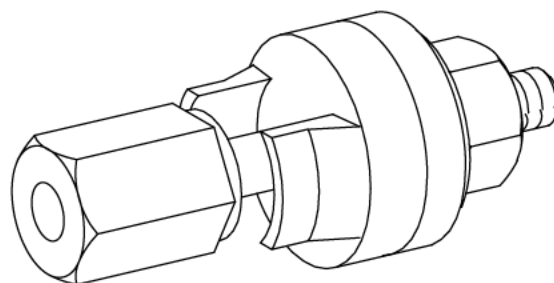
PWA 55320 -C

Figure T2. PWA 55320 Fixture



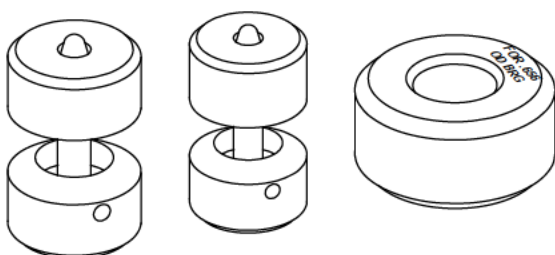
PWA 55380 -C

Figure T3. PWA 55380 Pump



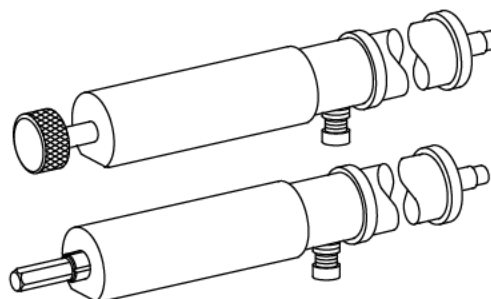
PWA 56662 -C

Figure T4. PWA 56662 Puller



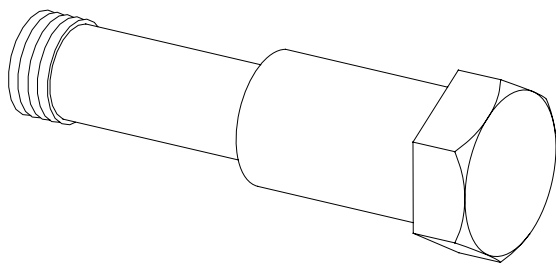
PWA 57198 -C

Figure T5. PWA 57198 Anvil



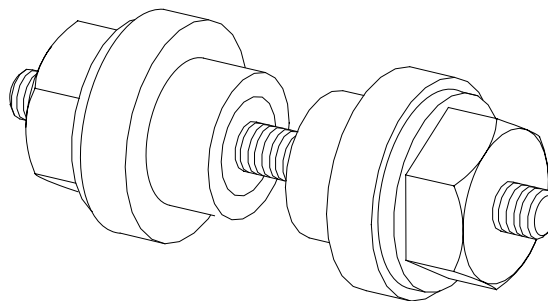
PWA 70109 -C

Figure T6. PWA 70109 Puller



LM1085

Figure T7. LM 1085 Drift



LM1086

Figure T8. LM 1086 Pusher

1. INTRODUCTION.

- a. This work package contains instructions for repair of inlet front compressor stator bell crank linkage assembly.

2. INLET FRONT COMPRESSOR STATOR BELL CRANK LINKAGE ASSEMBLY - BUSHING REPLACEMENT.

(See Figures 1 and 2.)

NOTE

Either PWA 70109 puller and PWA 55380 pump (step a.) or LM 1085 drift (step b.) may be used to remove bushings.

- a. Remove unserviceable bushings from linkage arm(6) using PWA 70109 and PWA 55380 as follows:

- (1) Install PWA 70109 puller against linkage arm face.
- (2) Adjust puller jaw to fit halfway through bushing hole (between bushing halves) to engage jaw against hidden end of bushing half.

NOTE

Expander screw keeps jaws engaged.

- (3) Install detail-3 expander screw through puller jaw and secure. See figure 1.

- (4) Connect PWA 55380 pump to puller and remove bushing half by applying hydraulic pressure.
- (5) Reverse puller and remove other bushing half or drift bushing half out.

- b. Remove unserviceable bushings from linkage arm using LM 1085 as follows:

- (1) Tap through bushings with 7/16-20 tap.
- (2) Thread LM 1085 drift into bushing.
- (3) Place bushing/linkage arm on large socket or similar backup tool.
- (4) Drift bushing out using soft mallet.
- (5) Turn linkage arm over and repeat process for other bushing.

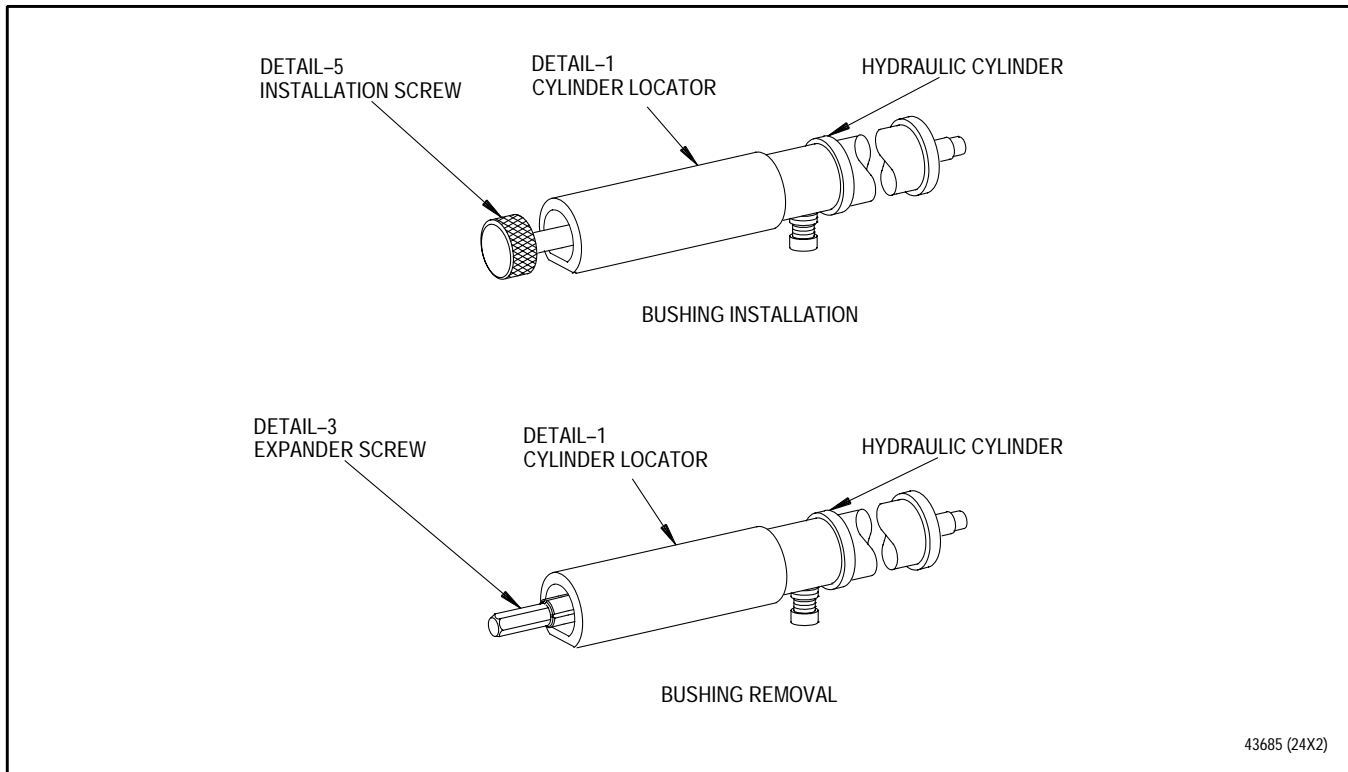


Figure 1. PWA 70109 Puller

NOTE

Steel/composite bearings (PN 4084169) are installed using LM 1086 pusher per step d. or PWA 50719 puller per step e.

c. Deleted.

d. Install steel/composite bushings in linkage arm using LM 1086 pusher as follows:

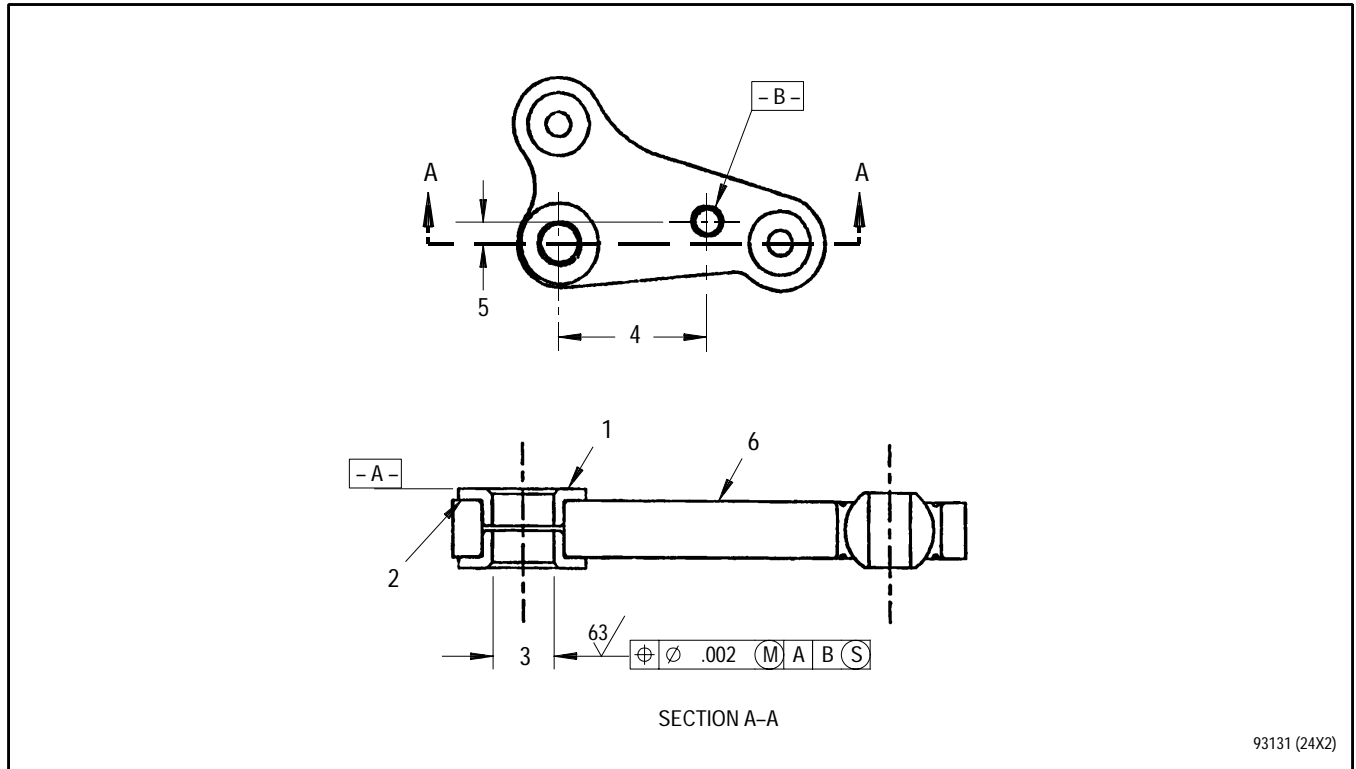
(1) Put nut, guide bushing, and bushing on threaded rod.

(2) Insert threaded rod through bushing hole in linkage arm.

(3) Put second bushing, guide bushing and nut on other end of threaded rod. Rotate nut as required to seat bushings. See figure 2.

(4) Remove LM 1086 pusher by removing nuts, guide bushings and threaded rod.

- e. Install steel/composite bushings in linkage arm using PWA 50719 puller as follows:
- (1) Place bushing, flanged end first, on piloted end of PWA 50719 puller.
 - (2) Install threaded end of puller through appropriate hole in linkage arm.
 - (3) Install nut detail on threaded end of puller and tighten to pull bushing into hole. Bushing flange shall contact body of linkage arm when fully seated. See figure 2.
 - (4) Repeat procedure for second bushing.



93131 (24X2)

1. Bushing, two required per assembly
2. Surface contact required, two places.
3. 0.3752 to 0.3772 inch diameter
4. 1.497 inch (reference)
5. 0.213 inch (reference)
6. Linkage arm

Figure 2. Inlet Front Compressor Stator Linkage Bell Crank Assembly - Bushing Replacement

3. INLET FRONT COMPRESSOR STATOR LINKAGE BELL CRANK ASSEMBLY - SELF-ALIGNING BEARING REPLACEMENT

(See Figure 3.)

- a. Remove unserviceable bearings as follows:



Grinding into linkage arm material when removing staked material will cause damage to part.

- (1) Grind or cut staked edge of arm (four places) on one side. See T.O. 2-1-111, SPOP 530.
- (2) Use PWA 56662 bearing puller to remove spherical bearing.
- (3) Install screw detail through bearing with cup detail against side of bearing that staked material was removed. Secure with detail washer and nut.
- (4) Tighten detail nut to remove bearing from linkage arm.
- (5) Disassemble bearing puller and discard bearing.

- b. Clean bell crank assembly per T.O. 2-1-111, SPOP 209, Method A.

- c. Fluorescent penetrant inspect linkage arm surface per T.O. 2-1-111, SPOP 82. No cracks allowed.

- d. Clean bearing hole in linkage arm. Hand polish to remove score marks in holes using crocus cloth. If necessary, run a reamer through the holes. If holes are over maximum dimension, then discard linkage arm.

- e. Lightly coat the linkage arm bearing hole ID with engine oil. Wipe off excess.

- f. Place new self-aligning bearing into the freezer for a minimum of 20 minutes.



Failure to install bearing before it normalizes may result in damage to linkage arm.

- g. Remove bearing from freezer and install into hole in linkage arm before bearing temperature normalizes.

- h. Using PWA 56662 puller, install bearing into linkage arm as follows:

- (1) Install lead screw detail of puller through bearing.
- (2) Align bearing with hole in linkage arm.
- (3) Assemble nut and detail washer onto lead screw detail.
- (4) Tighten detail nut to seat bearing according to figure 3.

- (5) Remove puller after bearing has warmed to room temperature.

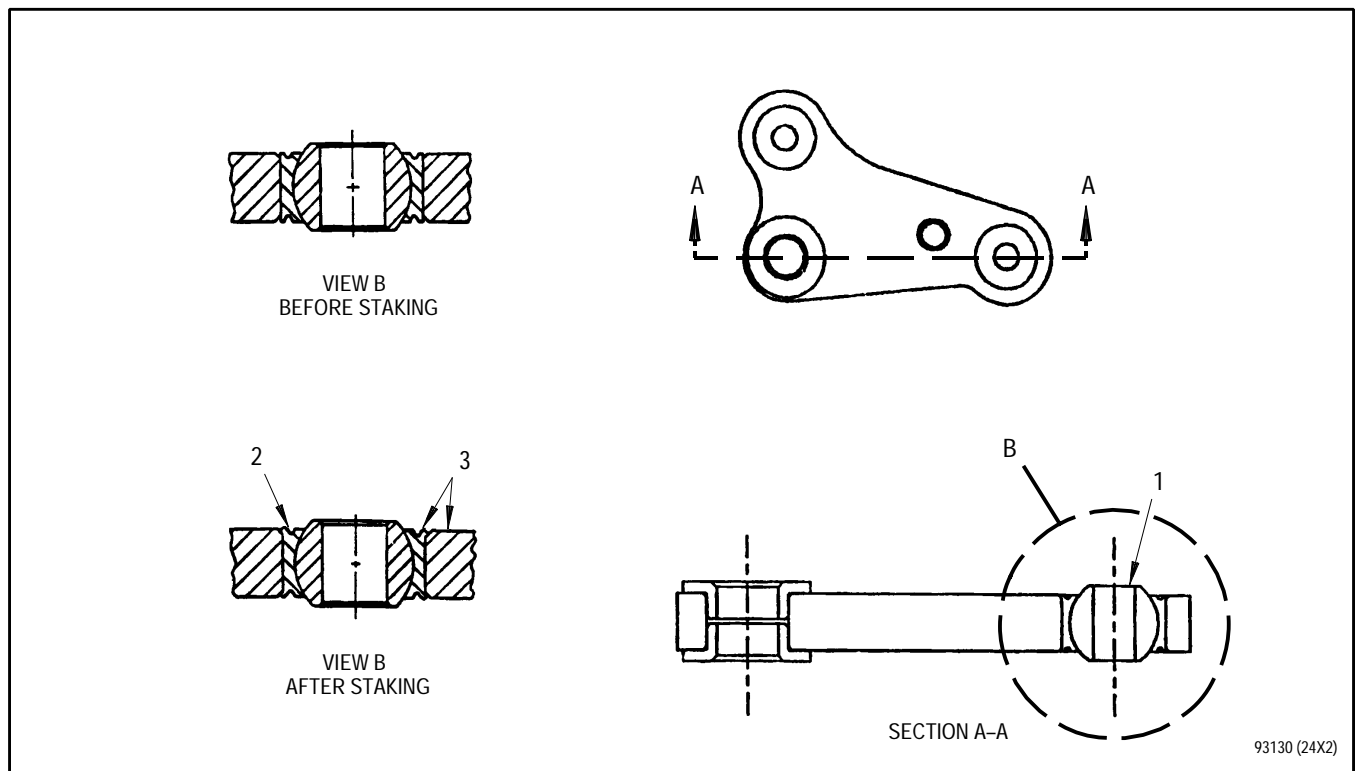
- i. Install PWA 55320 fixture with PWA 57198 die set to stake spherical bearings to linkage arm.

- j. Attach PWA 55380 pump to PWA 55320 fixture.



Applying excess pressure during hydraulic staking operation may result in damage to parts.

- k. Install linkage arm in fixture with die set. Actuate pump and groove stake the bearing 360 degrees until the flaring cone comes in full contact with the arm body. Refer to T.O. 2-1-111, Section XXV and see figure 3.
- l. Remove linkage arm from the fixture. Remove pump and die set from the fixture.
- m. Inspect bearing stake per figure 3. Spherical ball shall move through 10 degrees minimum cone angle with a torque of 3.0 pounds maximum, using finger pressure only. Bearing outer race must be securely staked onto linkage arm with no movement in any direction.
- n. Clean bell crank assembly using isopropyl alcohol.



1. Self-aligning bearing, two required per assembly
2. 360 Degree groove stake, both sides
3. These surfaces must be flush within 0.005 inch

Figure 3. Inlet Front Compressor Stator Linkage Bell Crank Assembly - Bearing Replacement

WORK PACKAGE

INTRODUCTION

INLET/FAN MODULE -

ASSEMBLY OF SUBASSEMBLIES

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2					0

1. INTRODUCTION.

- a. This work package introduces the 600 00 through 699 00 series of work packages for the Inlet/Fan Module assembly of subassemblies. The following work packages are included in this series:

WP No.	Title
601 00	Housing Assembly, No. 1 Bearing (Seal Assembly, Face, No. 1 Bearing; and Seal Ring) - Assembly
602 00	Seal Assembly, No. 1 Bearing - Air Leakage Check
603 00	Case Assembly, Fan Inlet - Assembly
604 00	Selection of Moment-weighted Compressor Blades (Stages One Through Three)
605 00 through 699 00	Open

WORK PACKAGE

TECHNICAL PROCEDURES

**HOUSING ASSEMBLY, No. 1 BEARING, (SEAL
ASSEMBLY, FACE, No. 1 BEARING; AND SEAL RING) -**

ASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 6					0

T.O. 2J-F100-53-6

WP 601 00

REFERENCE MATERIAL REQUIRED

Title	Number
Inlet/Fan Module - - - - -	T.O. 2J-F100-53-6
Seal Assembly, Face, No. 1 Bearing - Inspection - - - - -	WP 306 00
Seal Assembly, No. 1 Bearing - Air Leakage Check - - - - -	WP 602 00
Inlet/Fan Module - Table of Limits - - - - -	WP 801 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Oil, lubricating	MIL-L-7808

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
Cotter pin	MS9245-22	5

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for assembly of No. 1 bearing housing assembly.

2. No. 1 BEARING SEAL FACE ASSEMBLY AND SEAL RING - INSTALLATION.

(See Figures 1 through 3.)

NOTE

This procedure shall be performed on a clean bench. Contamination of seal ring can result in damage to polished sealing surface.

- a. Check gap clearance of metal seal ring as follows:

NOTE

Seal face assembly may be used to align seal ring.

- (1) Apply lubricating oil to ring and wipe off excess. Carefully install ring onto No. 1 bearing housing with large outside step facing up as shown in figure 1.

NOTE

Seal face assembly may be used to align seal ring.

- (2) Measure gap clearance. Clearance must be from 0.052 to 0.081 inch. (Refer to WP 801 00, Reference 2493.) Replace seal ring if limits are not met.

- (3) Remove ring from housing.

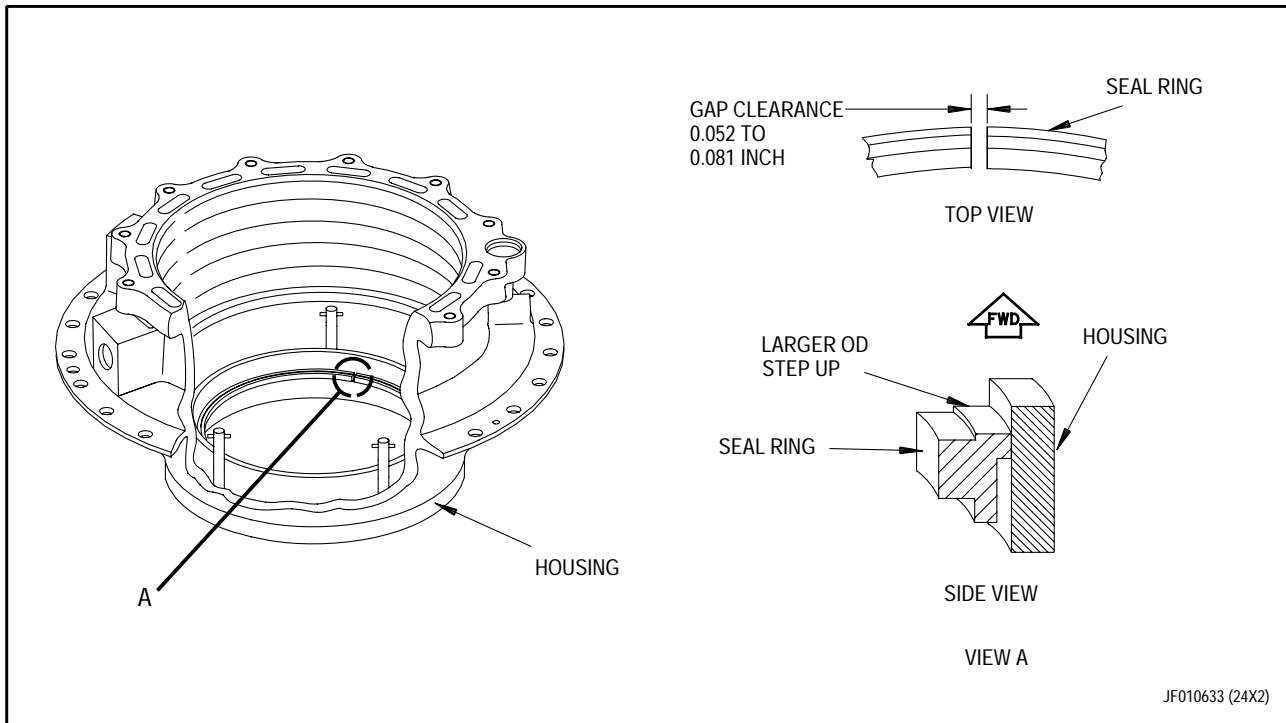
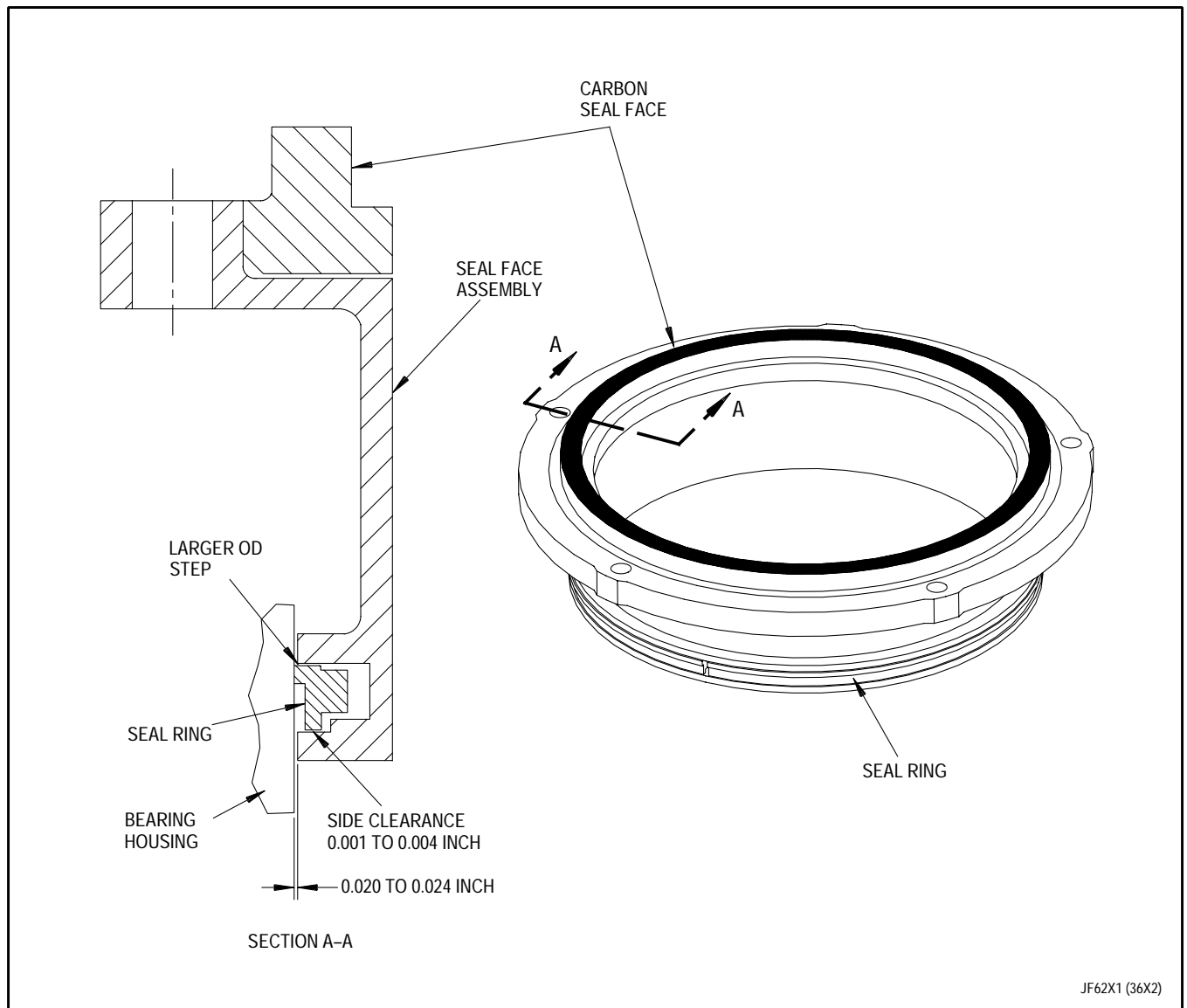


Figure 1. No. 1 Bearing Seal Face Assembly and Seal Ring - Seal Ring Dimensional Check

- b. Apply lubricating oil to ring if necessary and wipe off excess oil.
- c. Carefully install ring into seal face assembly with large outside step towards carbon seal face. See figure 2.
- d. Measure side clearance between seal ring and seal face assembly. Clearance must be from 0.001 to 0.004 inch. (Refer to WP 801 00, Reference 2495.)



JF62X1 (36X2)

Figure 2. No. 1 Bearing Seal Face Assembly and Seal Ring - Seal Ring Installation

- e. Ensure that ring is seated properly and moves freely.
- f. Install springs on five pins. See figure 3.
- g. Position No. 1 bearing seal face assembly on bench with carbon face up.
- h. Inspect carbon face per WP 306 00.
- j. Measure gap between seal face assembly and housing. Clearance must be from 0.020 to 0.024 inch. (Refer to T.O. 2J-F100-53-6, WP 801 00, Reference 2469.)
- k. Compress seal face assembly and install PN MS9245-22 cotter pins. Bend longer leg of pins slightly as shown in figure 3.

NOTE

12 o'clock position on housing is located halfway between Ps2 antirotation lugs and No. 1 bearing oil pressure tube boss.

- i. Align gap in ring at 12 o'clock position and install seal face assembly into No. 1 bearing housing assembly. Align springs and pins with holes in seal face assembly.
- l. Apply downward pressure and slowly release seal face assembly several times to make sure seal face assembly moves freely.
- m. Perform air leakage check. See WP 602 00.
- n. Place housing assembly on bench and compress seal face assembly. Bend cotter pins by wrapping around sides of shoulder pins (longer leg out) as shown in figure 3.
- o. Store assembly in protective container.

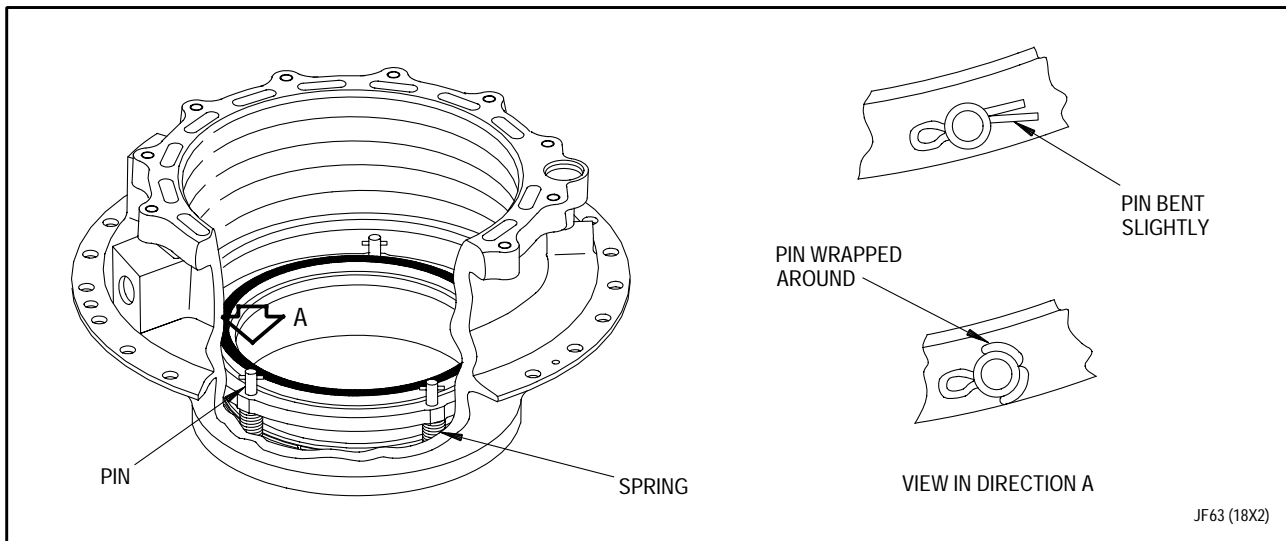


Figure 3. No. 1 Bearing Seal Face Assembly and Seal Ring - Seal Face Assembly Installation

WORK PACKAGE

TECHNICAL PROCEDURES

SEAL ASSEMBLY, NO. 1 BEARING -

AIR LEAK CHECK

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 10

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 9					
10 Blank					
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	0				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

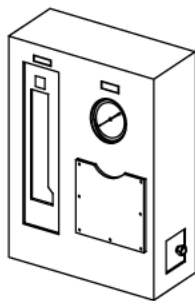
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

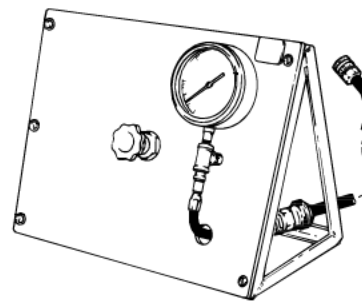
Paragraph	Function - Tool Nomenclature	Tool Number
3	No. 1 Bearing Seal Assembly - Air Leak Check	
	Flowmeter, Oil seal assemblies airflow check - - - - -	PWA 6507
	Regulator, Air pressure - - - - -	PWA 21875
	Fixture, No. 1 bearing housing assembly air leak check -	PWA 57669

ILLUSTRATED SUPPORT EQUIPMENT



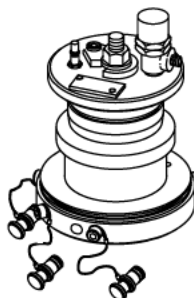
PWA 6507-C

Figure T1. PWA 6507 Flowmeter



PWA 21875 -C

Figure T2. PWA 21875 Regulator



PWA 57669 -C

Figure T3. PWA 57669 Fixture

T.O. 2J-F100-53-6

WP 602 00

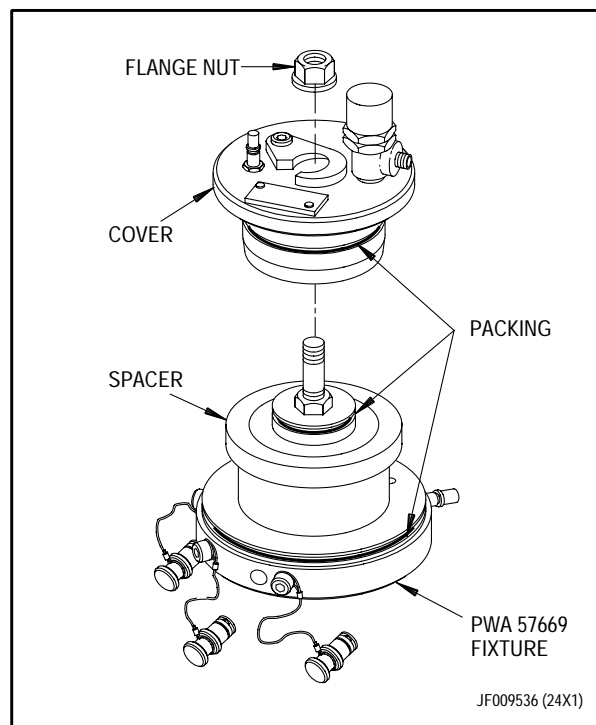
1. INTRODUCTION.

- a. This work package contains instructions for air leak check of No. 1 bearing seal assembly.

2. NO. 1 BEARING SEAL ASSEMBLY AIR LEAK CHECK.

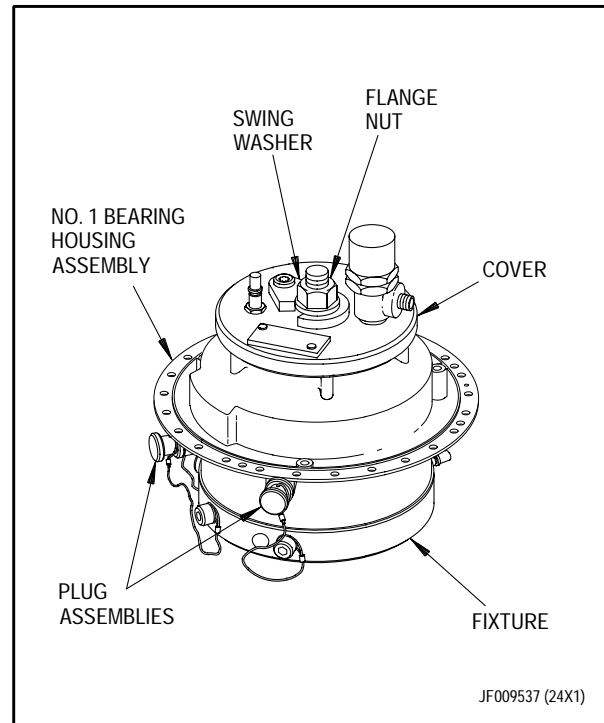
(See figure 1.)

- a. Loosen PWA 57669 fixture detail-5 flange nut and remove detail-26 cover from fixture.
- b. Check condition of packings and detail-25 spacer to prevent leakage indications.
- c. Clean spacer detail-25 surface.



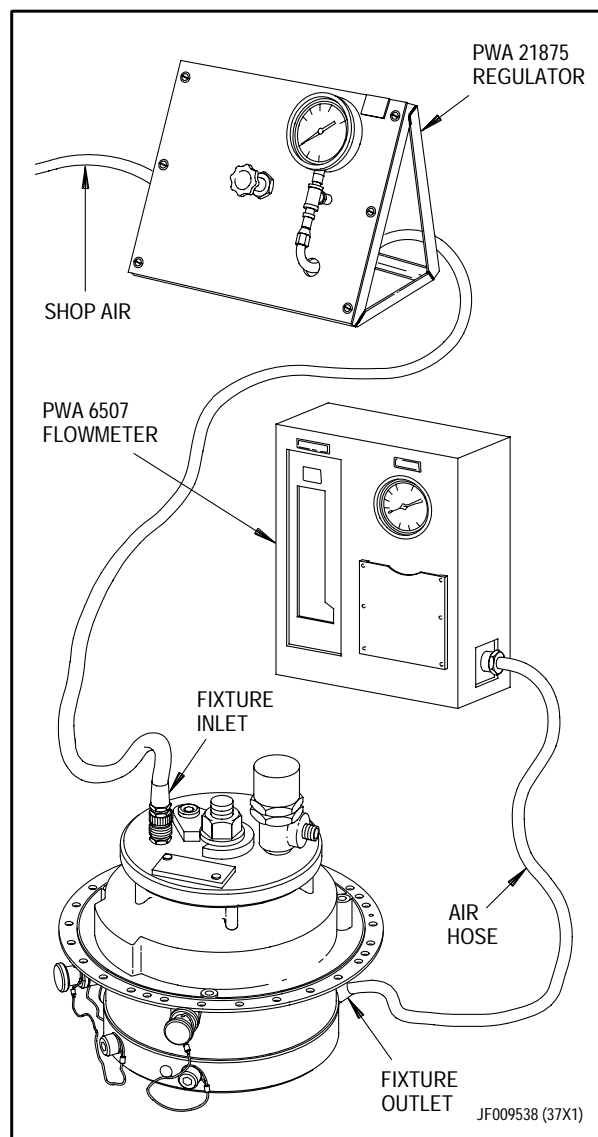
**Figure 1. No. 1 Bearing Seal Assembly -
Air Leak Check (Sheet 1 of 5)**

- d. Carefully install No. 1 bearing housing assembly in PWA 57669 fixture with carbon seal face down.
- e. Install detail-26 cover over seal assembly and secure using detail-4 swing washer and detail-5 flange nut on detail-26 cover.
- f. Install three detail-21 plug assemblies into housing assembly and lock into position.



**Figure 1. No. 1 Bearing Seal Assembly -
Air Leak Check (Sheet 2 of 5)**

- g. Connect PWA 21875 regulator air hose supply to fixture inlet.
- h. Connect PWA 6507 flowmeter air hose to fixture outlet.



**Figure 1. No. 1 Bearing Seal Assembly -
Air Leak Check (Sheet 3 of 5)**



Introduce air slowly. If carbon seal is not seated properly large flow of air may damage PWA 6507 flowmeter.

- i. Slowly turn knob on PWA 21875 regulator up to 45 psig.
- j. Read total leakage from flowmeter. Leakage must not exceed 2.25 standard cubic feet per minute (scfm).
 - (1) If leakage is less than 2.25 scfm, seal assembly is acceptable. Proceed to step k.
 - (2) If leakage is more than 2.25 scfm, tap fixture lightly with plastic mallet to seat seal ring.
 - (3) If leakage is still more than 2.25 scfm proceed to step 1.
- k. Slowly shut off airflow to fixture and remove fixture cover and housing assembly.

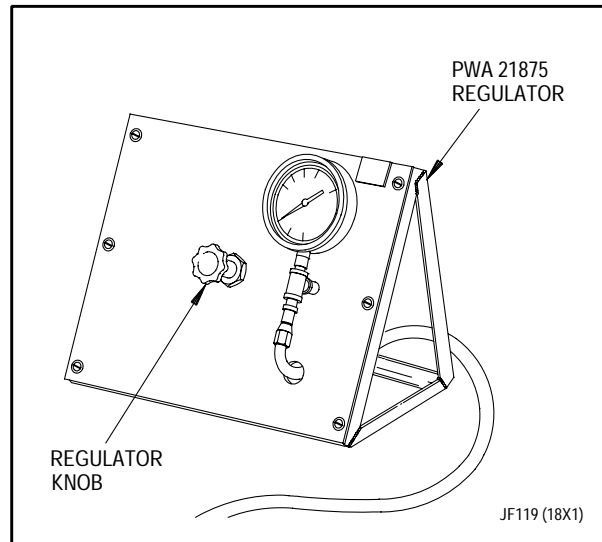


Figure 1. No. 1 Bearing Seal Assembly - Air Leak Check (Sheet 4 of 5)

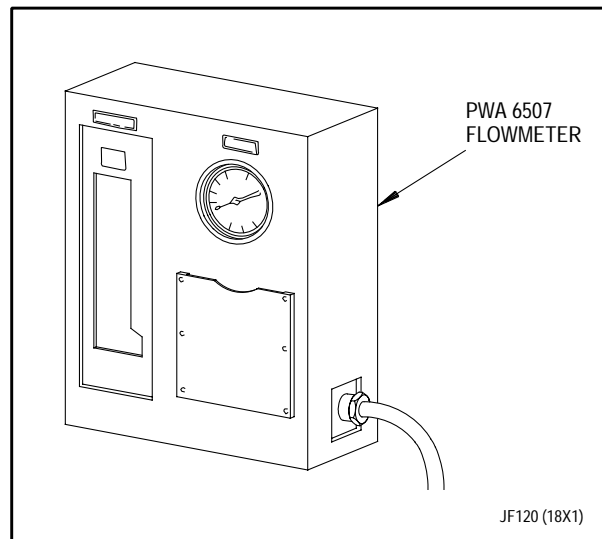


Figure 1. No. 1 Bearing Seal Assembly - Air Leak Check (Sheet 5 of 5)

1. If leakage is over 2.25 scfm check following:
 - (1) Compress and release seal assembly against its springs to ensure it was not cocked or sticking.
 - (2) Clean seal assembly.
 - (3) Repeat airflow check. If leakage exceeds 2.25 scfm, disassemble seal assembly, per WP 022 00.
 - (a) With seal ring removed, check gap clearance per WP 601 00. Ensure larger OD faces down when installed.
 - (b) Replace No. 1 bearing seal assembly details and repeat airflow check.

WORK PACKAGE

TECHNICAL PROCEDURES

CASE ASSEMBLY, FAN INLET -

ASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 14

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	30	3 - 4	19	8	15
2A	19	5 - 7	0	9 - 12	7
2B Blank Added	7				

REFERENCE MATERIAL REQUIRED

None

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
COMPOUND, ANTIGALLING (PWA 550)	HI-T-650 OR LUBRI-BOND HT
LOCKWIRE(0.025 INCH DIAMETER)	MS9226-03
LOCKWIRE(0.032 INCH DIAMETER)	MS9226-04
OIL, LUBRICATING	MIL-L-7808

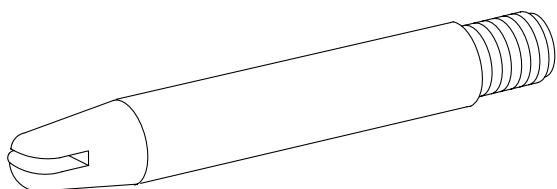
EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
PACKING, PREFORMED	ST1050-110	4

APPLICABLE SUPPORT EQUIPMENT

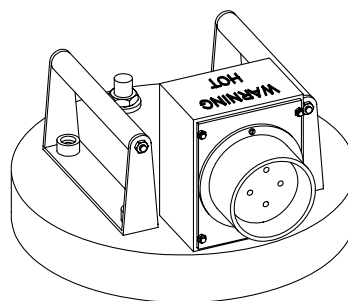
Paragraph	Function - Tool Nomenclature	Tool Number
2	FRONT COMPRESSOR STATOR VARIABLE INLET VANES - INSTALLATION	
	FRONT COMPRESSOR STATOR INLET SHROUD, INSTALLATION	
	PIN, ALIGNING (TWO REQUIRED) - - - - -	PWA 14383
	PUSHER/PULLER, INLET GUIDE VANE OUTER BUSHINGS - -	PWA 57790
4	NO. 1 BEARING HOUSING - INSTALLATION	
	NO. 1 BEARING HOUSING, INSTALLATION - - - - -	
	HEATER, FAN INLET CASE TO NO.1 BEARING HOUSING - -	PWA 56582
		OR
	HEATER, FAN INLET CASE/NO. 2 BRG SUPPORT INNER FLANGE - - - - -	PWA 56323
		OR
	HEATER, FAN INLET CASE/NO. 1 BRG - - - - -	PWA 52859
	CONTROL, HEATER - - - - -	PWA 61685

ILLUSTRATED SUPPORT EQUIPMENT



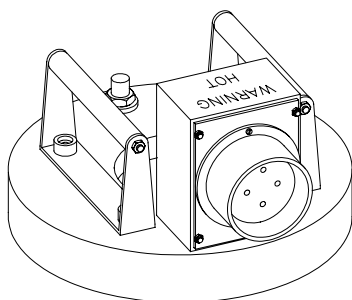
PWA 14383 -C

Figure T1. PWA 14383 PIN



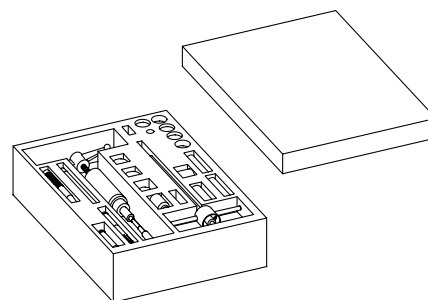
PWA 56323 -C

Figure T2. PWA 56323 HEATER



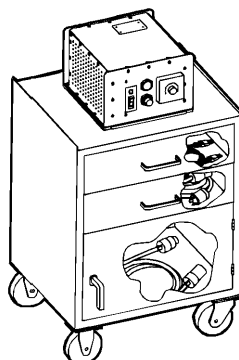
PWA 56582 -C

Figure T3. PWA 56582 HEATER



PWA 57790 -C

Figure T4. PWA 57790 PUSHHER/PULLER



PWA 61685 -C

Figure T5. PWA 61685 CONTROL

1. INTRODUCTION.

- a. This work package contains instructions for assembly of the fan inlet case.

2. FRONT COMPRESSOR STATOR VARIABLE INLET VANES - INSTALLATION.

(See Figure 1.)

- a. Position fan inlet case front end down on work bench.



No. 1 bearing pressure tube, Ps2 tube, and No. 1 bearing oil scavenge tubes do not come out of fan inlet case and shall not be rotated. Attempts to rotate tubes can result in damage to tubes.

- b. If necessary, pull pressure, scavenge, and Ps2 tubes outward from fan inlet case until they stop. Secure temporarily.
- c. Install variable vane OD bearings into fan inlet case as follows:

- (1) Install variable vane OD bearing onto detail-2 bracket of PWA 57790 pusher/puller kit (See figure 1, sheet 1.)
- (2) Install OD bearing into fan inlet case with detail 2-1 stud of PWA 57790 pusher/puller kit facing outward.
- (3) Install detail-2-2 reaction block of PWA 57790 pusher/puller kit over stud.
- (4) Install detail-2-7 tube and detail-2-5 flange nut of PWA 57790 pusher/puller kit onto stud and tighten fingertight.
- (5) Draw and seat OD bearing into fan inlet case by tightening flange nut. Torque nut 25 to 35 pound-inches.
- (6) Remove tooling.

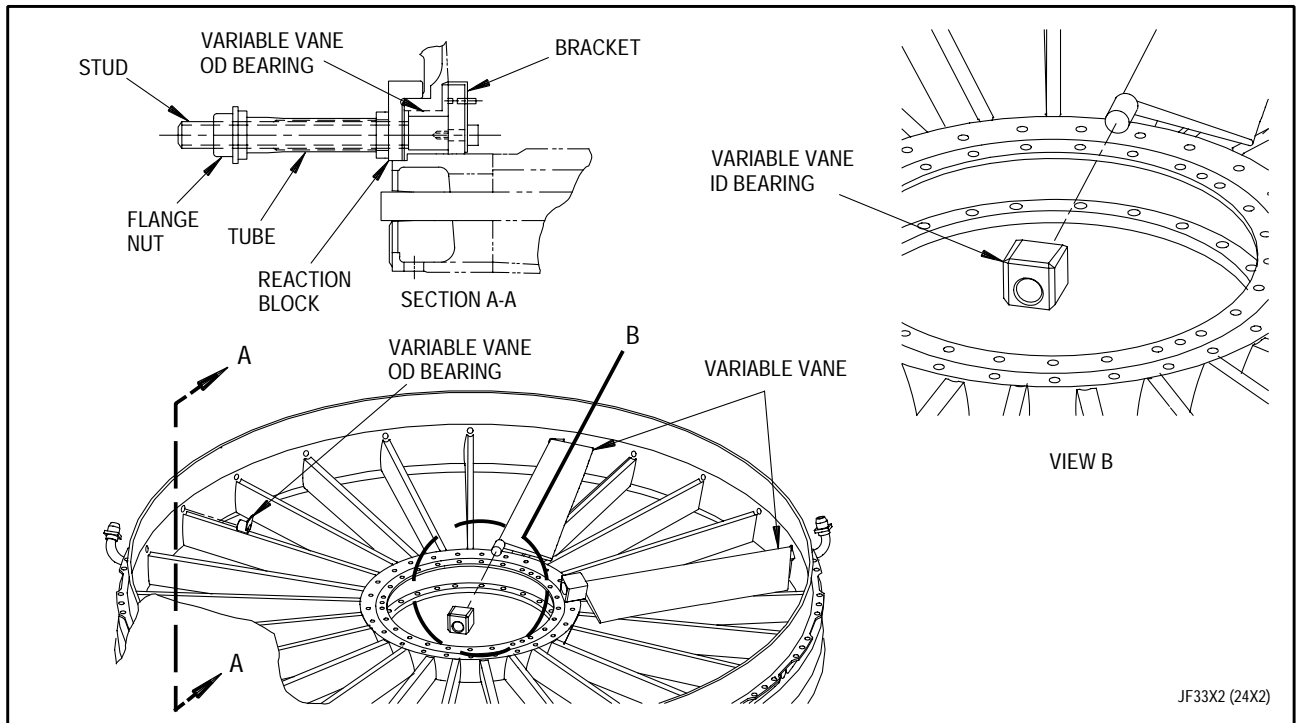


Figure 1. Front Compressor Stator Variable Inlet Vanes - Installation (Sheet 1 of 2)

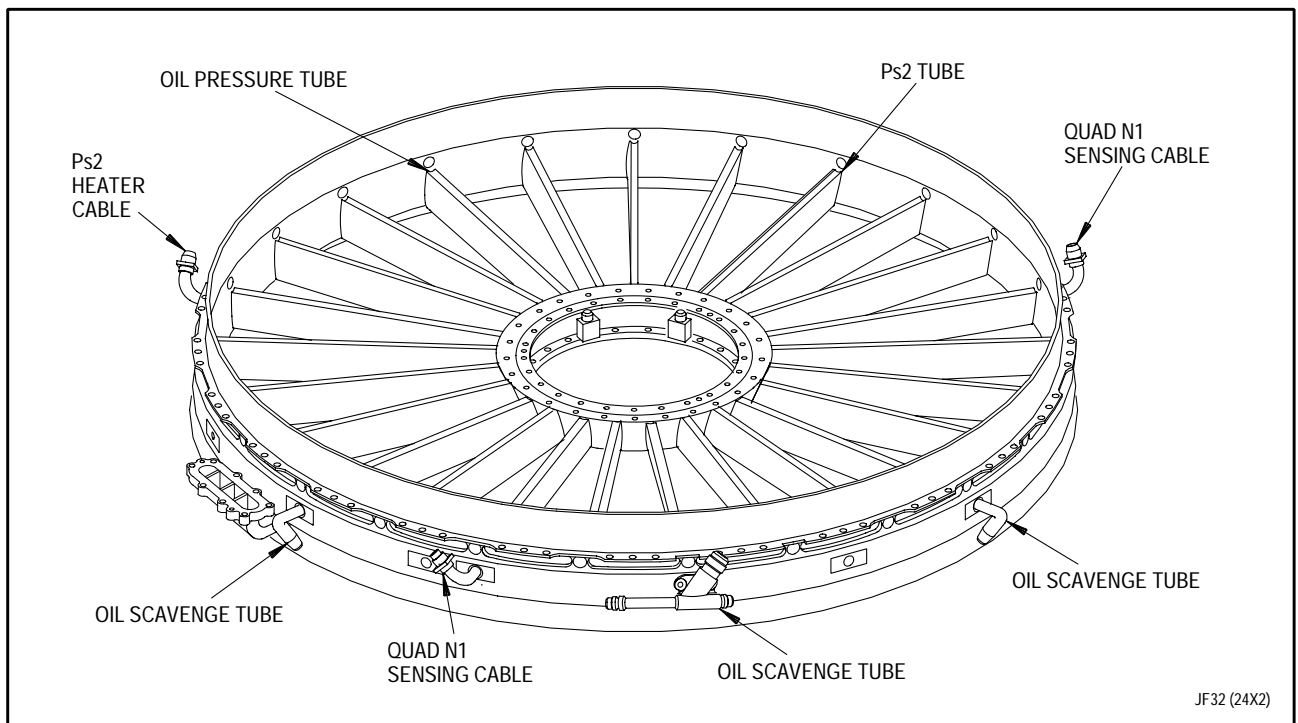


Figure 1. Front Compressor Stator Variable Inlet Vanes - Installation (Sheet 2 of 2)

NOTE

Quad N1 sensing cables, Ps2 heater cable, oil pressure tube, oil scavenge tubes, and Ps2 tube pass through eight vane segments which are thicker than remaining vane segments.

- d. Install thick variable vanes at eight thick vane segment locations. See figure 1, sheet 2.

- e. Install thin variable vanes at remaining locations.
- f. Install ID bearings with bevel side up onto all variable vanes. See figure 1, sheet 1.
- g. Check installed variable vanes for looseness, rubbing, or contact with fan inlet case. If any of these conditions are found, replace bearing.

3. FRONT COMPRESSOR STATOR INLET SHROUD - INSTALLATION.

(See Figure 2.)

- a. Install PWA 14383 aligning pins in between ID bearings on rear of fan inlet case inner flange 180 degrees apart.
- b. Chill Shroud at least 15 minutes in freezer.
- c. Position variable vanes so rubber inlays on thick vanes face upward.
- d. Align dowel pins of fan inlet case with dowel pin holes in shroud. Install shroud. Refer to figure 2.
- e. Twist variable vanes to prevent variable vanes from binding and to align bearings in shroud.
- f. Install seven equally spaced 0.190-32 UNJF-3A workbolts. Tighten to seat shroud.
- g. Allow shroud to return to room temperature.
- h. Remove aligning pins and workbolts.
- i. Lubricate threads of bolts with PWA 550 antigalling compound. Install bolts and torque 27 to 30 pound-inches.
- j. Lockwire bolts using MS9226-04 lockwire.

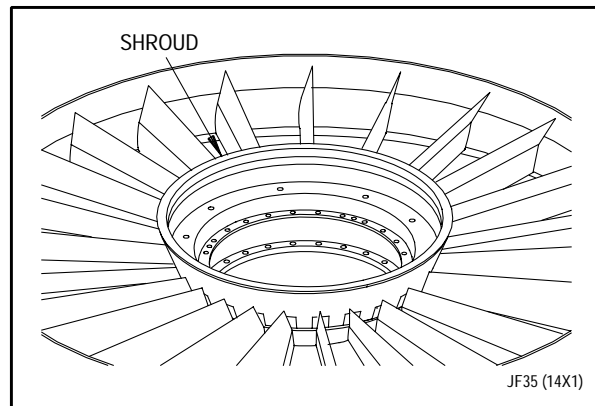


Figure 2. Front Compressor Stator Inlet Shroud - Installation

4. NO. 1 BEARING HOUSING - INSTALLATION.

(See Figures 3, 3A, 3B, and 4)

- a. Ensure that locking (run-on) torques of clinch nuts are within 2.0 to 13 pound-inches. (See figure 3.) Replace clinch nuts not within limits.
- b. Lubricate PN ST1050-110 packings with MIL-L-7808 engine oil and install packings on ID ends of pressure and scavenge tubes.
- c. Position PWA 56582 heater on rear side of fan inlet case inner flange. Ensure that heater thermocouple contacts surface being heated.
- d. Remove bolts(1, figure 4) from Ps2 tube elbow(2), pressure tube elbow(6) and oil scavenge tube elbows(3,4 and 5) and position tubes outward.



Overheating fan inlet case may cause damage to parts.

- e. Connect heater to PWA 61685 heater control. Set temperature at 250°F (121°C). Connect control to power source.
- f. Heat approximately 10 minutes.
- g. For engines not incorporating T.O. 2J-F100229(I)-503, proceed as follows:

- (1) Remove heater and install housing by aligning dowel pin of fan inlet case with dowel pin hole of housing. See figure 3. Lightly tap housing with nonmetallic mallet to seat.
- (2) Apply PWA 550 antigalling compound to threads of bolts used to secure housing to fan inlet case.
- (3) Hold housing and rotate fan inlet case onto its side.
- (4) While one technician holds housing and case, install four bolts 90 degrees apart and torque 27 to 30 pound inches to secure housing to fan inlet case. See figure 3A.

NOTE

Two technicians, 180 degrees apart, are required to lift and rotate fan inlet case.

- (5) Rotate fan inlet case to front end up position. Install remaining bolts. Torque bolts 27 to 30 pound-inches.
- (6) Lockwire threaded end of bolts using MS9226-03 lockwire.
- (7) Proceed to step k.

h. For engines incorporating T.O. 2J-F100229(I)-503, proceed as follows: (See figure 3B.)

- (1) Remove heater and install housing by aligning dowel pin of fan inlet case with dowel pin hole of housing. See figure 3.
- (2) Install four evenly spaced workbolts to draw housing to inlet case.
- (3) Apply light coat of PWA 550 antigalling compound to threads of bolts(3, figure 3B).

NOTE

Three clamps sizes(1, figure 3B) are available to accommodate different cable sheath sizes and positions. The proper clamp size will prevent cable movement and minimize cable overbraid pinching.

- (4) Select appropriate clamp(1) to secure cables at three locations(4).

NOTE

Cable clamps and spacers require longer bolts.

- (5) Position three each clamps(1) and spacers(2) on inlet case inner flange. Pull cables tight to remove slack inside inlet case vane and secure cables, clamps and spacers with bolts(3).
- (6) Secure housing using remaining bolts(3).
- (7) Torque bolts 27 to 30 pound-inches.
- (8) Lockwire bolt heads with MS9226-03 lockwire.

i. Deleted

j. Deleted

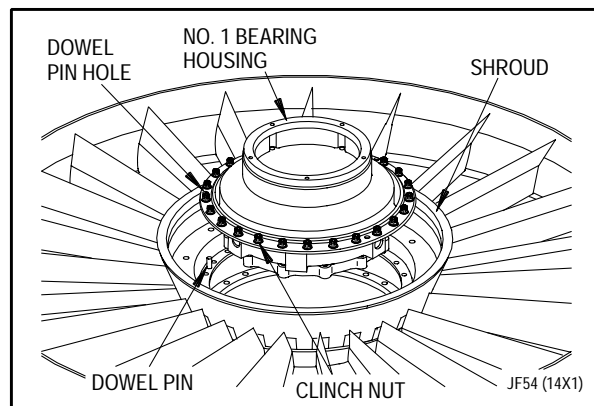


Figure 3. No. 1 Bearing Housing - Installation

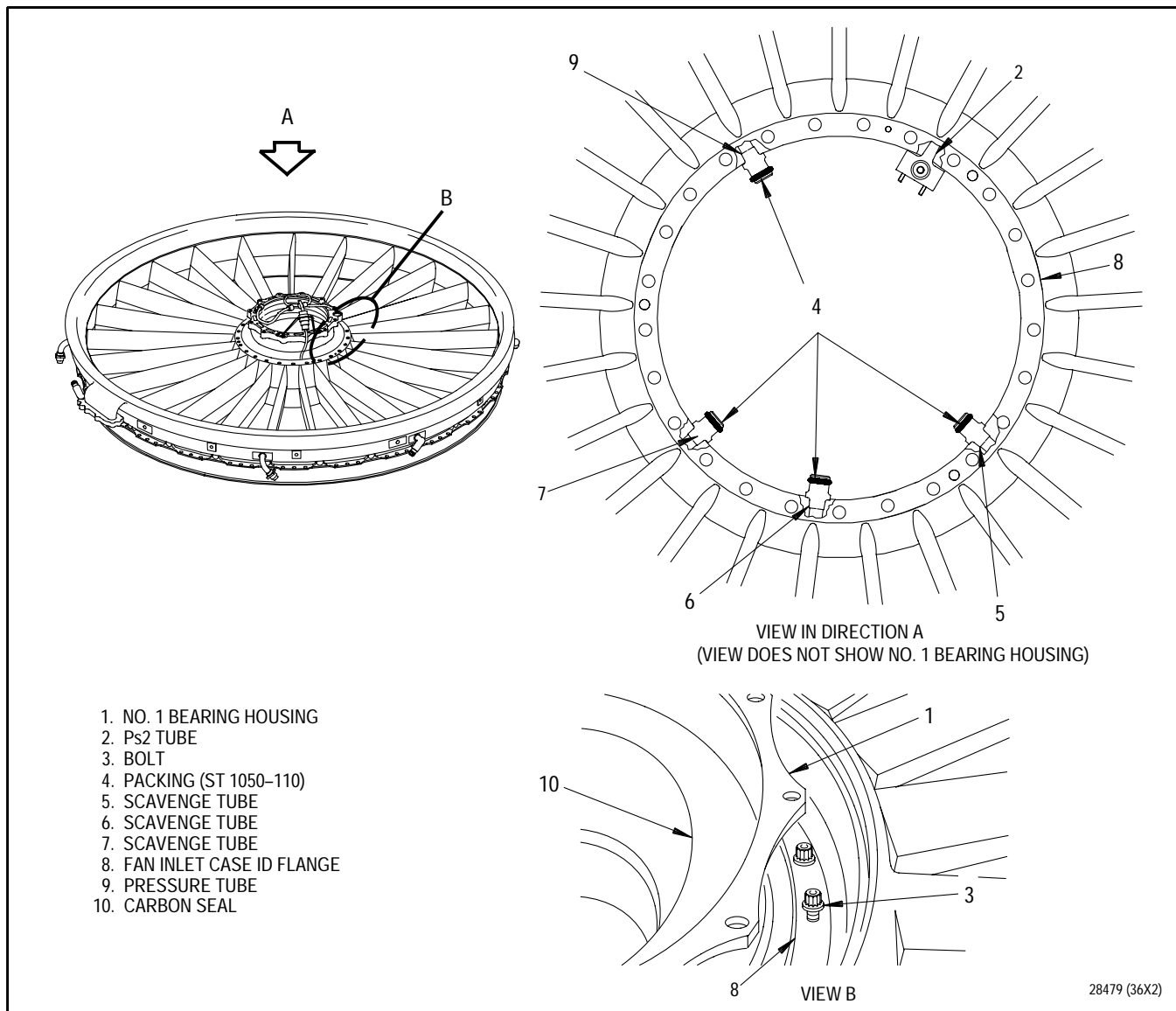


Figure 3A. No. 1 Bearing Housing - Installation (Before T.O. 2J-F100229(I)-503)

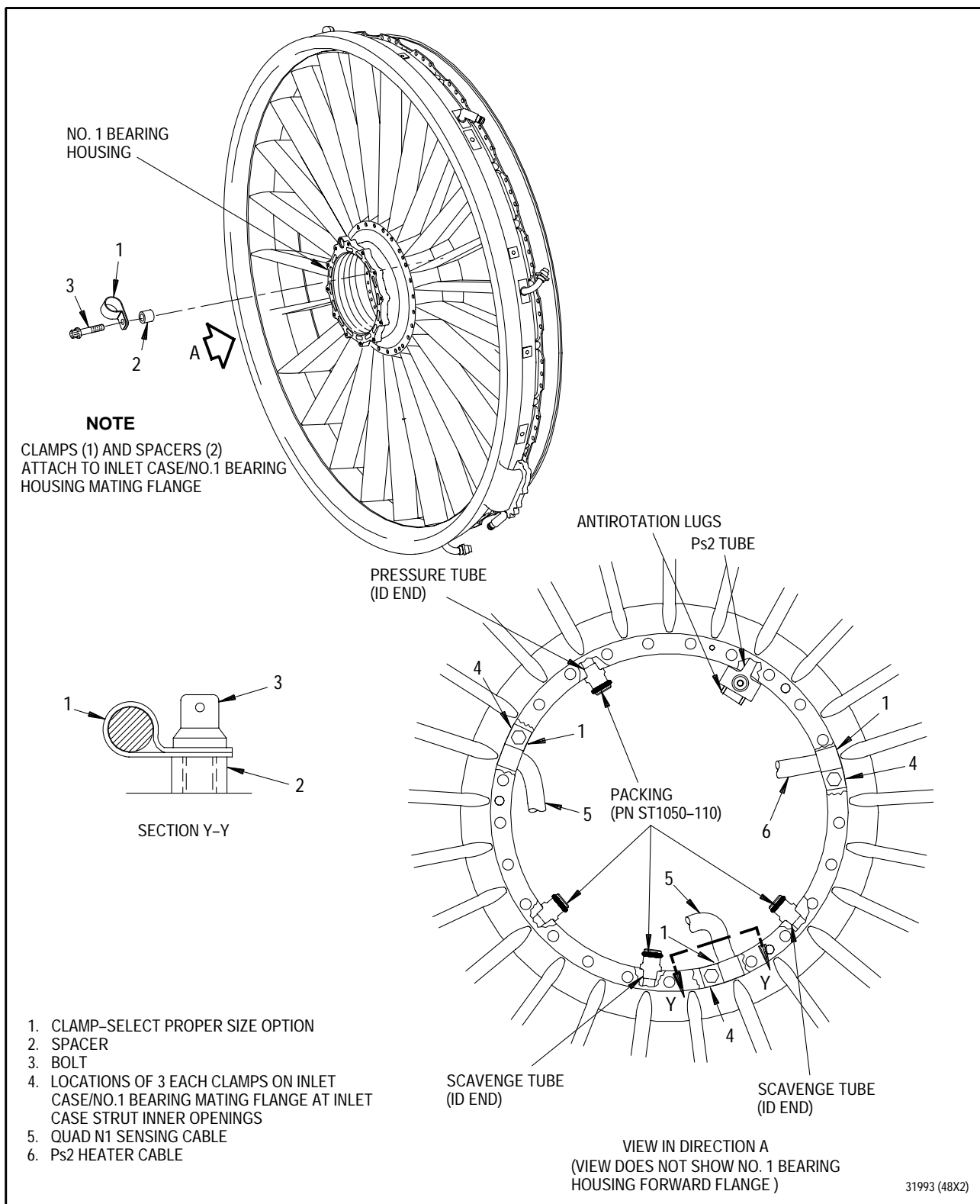


Figure 3B. No. 1 Bearing Housing - Installation (After T.O. 2J-F100229(I)-503)

- k. Install lubricated packings in grooves at inner end of pressure and scavenge tubes.
- l. Insert pressure and scavenge tubes into housing.
- m. Position Ps2 tube in between antirotation lugs.
- n. Lubricate bolts(1, figure 4) with PWA 550 antigalling compound.
- o. Install bolts(1) to secure Ps2 tube elbow(2) and pressure tube elbow(6) to fan inlet case. Torque 27 to 30 pound-inches.
- p. Install bolts(1) to secure oil scavenge tube elbows(3 and 5) and oil scavenge tube connector(4) to fan inlet case. Torque 27 to 30 pound-inches.
- q. Lockwire all bolts using MS9226-04 lockwire.
- r. Install protectors over front and rear faces of housing to protect carbon seal face.

5. FOLLOW-ON MAINTENANCE.

- a. Install fan inlet case on inlet/fan module per WP 702 00.

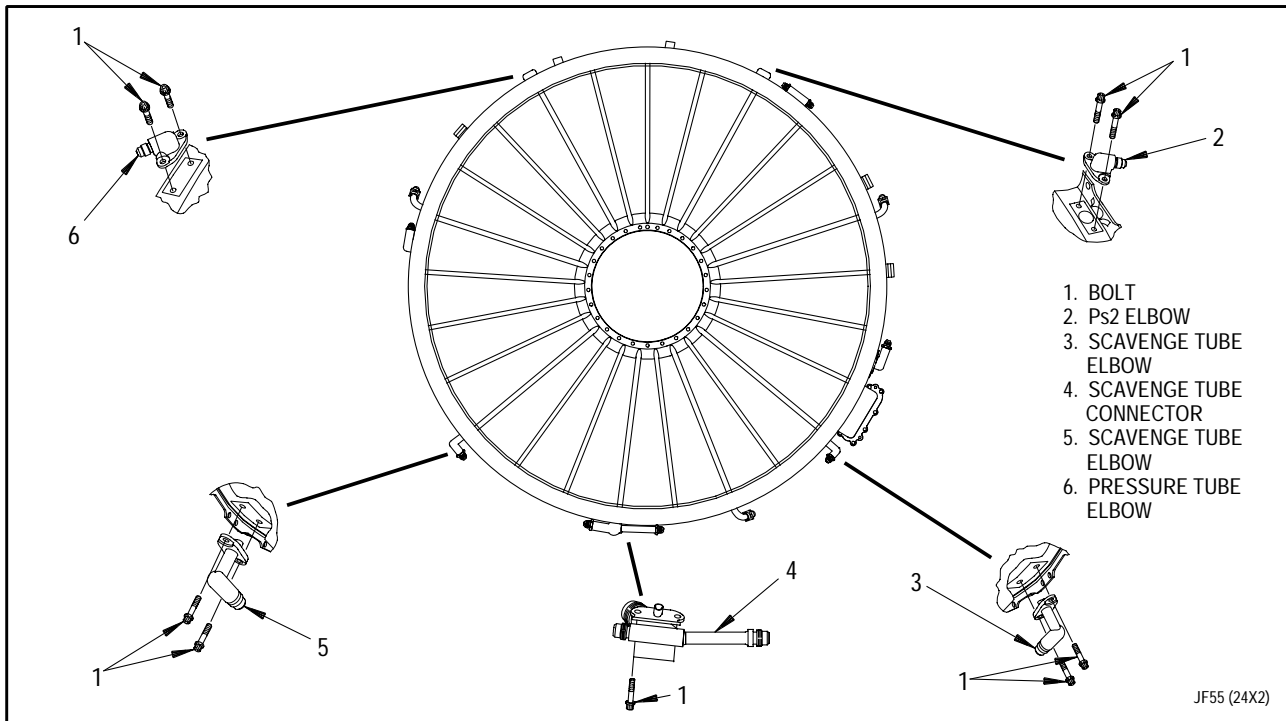


Figure 4. No. 1 Bearing Oil Scavenge Tube Elbows, Pressure Tube Elbow, and Ps2 Elbow - Installation

WORK PACKAGE

TECHNICAL PROCEDURES

SELECTION OF MOMENT-WEIGHTED COMPRESSOR BLADES (STAGES ONE THROUGH THREE)

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 6

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 6					

REFERENCE MATERIAL REQUIRED

Title	Number
Inlet/Fan Module - - - - -	T.O. 2J-F100-53-6
Blades, Compressor Rotor (Stages One Through Three) -	
Repair - - - - -	WP 415 00

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains instructions for selection of moment-weighted compressor blades, stages 1 through 3 before installation into drum rotor.

2. SELECTION OF MOMENT-WEIGHTED COMPRESSOR BLADES.

(See Table 1.)

- a. Determine correct part number and quantity of blades needed for specific disk being bladed.

NOTE

Paired moment-weighted blades consist of two blades of same moment-weight within 0.200 ounce-inch.

- b. Select blades in pairs by moment-weight so complete set is available to completely blade entire disk. Each blade of pair shall have same moment-weight marked on blade airfoil within 0.200 ounce-inch and be located 180 degrees opposite each other when installed in disk.

- c. Arrange blade pairs on bench based on blade pair moment-weights. Order pairs in two columns with heaviest moment-weight pair first, second heaviest second, third heaviest third, etc. (See table 1.)

(1) If blades in each row (each blade pair) are not equal weights, alternate heavier and lighter blades in each row as shown such that heavier and lighter blades in each column alternate down column.

(2) Number blades in column 1 from 1 through 21 as shown. Label top blade no.1, label last blade no.2, label 2nd from top blade no.3, label 2nd from last blade no.4, label 3rd from top blade no.5, etc. through 21.

(3) Number blades in column 2 from 22 thru 42 as shown. Label top blade no.22, label last blade no.23, label 2nd from top blade no.24, label 2nd from last blade no.25, label 3rd from top blade no.26, etc. through 42.

- d. Blades are now ready to be installed per sequence number marked on blade (Blade no.1 in position no.1, blade no.2 in position no.2, blade no.3 in position no.3, etc..).

Table 1. Selection of Moment-Weighted Compressor Blades**NOTE**

Blade pairs are shown by letter according to moment weight of blade pair, heaviest blade pair is lettered A, next heaviest blade pair is lettered B, and continuing on until all of blade pairs have been arranged.

Blade Pair Letter (By Moment Weight)		Installation Selection Sequence numbers Column 1	Installation Selection Sequence Numbers Column 2
Blade Pair Letter			
A	(Heaviest pair)	1 (Heavier blade)	22 (Lighter blade)
B	(2nd Heaviest pair)	3 (Lighter blade)	24 (Heavier blade)
C	(3rd Heaviest pair)	5 (Heavier blade)	26 (Lighter blade)
D	(4th Heaviest pair)	7 (Lighter blade)	28 (Heavier blade)
E	(5th Heaviest pair)	9 (Heavier blade)	30 (Lighter blade)
F	(6th Heaviest pair)	11 (Lighter blade)	32 (Heavier blade)
G	(7th Heaviest pair)	13 (Heavier blade)	34 (Lighter blade)
H	(8th Heaviest pair)	15 (Lighter blade)	36 (Heavier blade)
I	(9th Heaviest pair)	17 (Heavier blade)	38 (Lighter blade)
J	(10th Heaviest pair)	19 (Lighter blade)	40 (Heavier blade)
K	(11th Heaviest pair)	21 (Heavier blade)	42 (Lighter blade)
L	(12th Heaviest pair)	20 (Lighter blade)	41 (Heavier blade)
M	(13th Heaviest pair)	18 (Heavier blade)	39 (Lighter blade)
N	(14th Heaviest pair)	16 (Lighter blade)	37 (Heavier blade)
O	(15th Heaviest pair)	14 (Heavier blade)	35 (Lighter blade)
P	(16th Heaviest pair)	12 (Lighter blade)	33 (Heavier blade)
Q	(17th Heaviest pair)	10 (Heavier blade)	31 (Lighter blade)
R	(18th Heaviest pair)	8 (Lighter blade)	29 (Heavier blade)
S	(19th Heaviest pair)	6 (Heavier blade)	27 (Lighter blade)
T	(20th Heaviest pair)	4 (Lighter blade)	25 (Heavier blade)
U	(lightest pair)	2 (Heavier blade)	23 (Lighter blade)

3. ALTERNATE METHOD FOR SELECTION OF MOMENT-WEIGHTED COMPRESSOR BLADES.

(See Table 2.)

NOTE

The following procedure is to be used only when complete set of paired moment-weighted blades (two blades of same moment-weight within 0.200 ounce-inches) is not available. In this case all blades shall be moment-weighted and marked with numerical ounce-inches value. Refer to WP 415 00.

- a. Determine correct part number and quantity of blades needed for specific disk that is being bladed.

NOTE

Verify that each blade has numerical moment-weight value in ounce-inches marked on convex side of blade airfoil near tip of blade.

- b. Arrange blades on bench by moment-weight, heaviest to lightest.
- c. Mark two heaviest blades with pairing Letter A. Mark next two heaviest blades with pairing Letter B. Continue in this manner until all blades are identified with pairing letters.

- d. For each pair of blades, mark moment weight difference on heavier blade. See column(2) in table 2 for example.

NOTE

Table 2 uses 3rd stage blades as an example. There are 42 3rd stage blades per rotor. For 1st and 2nd stage rotors, procedure is same, but number of blades is different.

- e. Arrange blades on table in two rows and mark installation sequence numbers as follows:
 - (1) Select pair of blades with largest moment weight difference. (Pair H, columns (1) and (2) in table 2.)
 - (2) Place heavier blade from pair just selected, on bench, to start row of blades. See H, column (3) in table 2.
 - (3) Place lighter blade from same pair, on bench, to start second row of blades. See column (4) in table 2.
 - (4) Select pair of blades with second largest weight difference. (Pair D in table 2.)

Table 2. Compressor Blades Installation Sequence - Example (Third Stage)

(1) Alphabetical Letter Marked on Each Blade in Pair	(2) Moment Weight Difference Marked on With Same Pairing Letter	(3) Installation Sequence No.	(4) Installation Sequence No.
H	0.400	1 (Heavier blade H)	22 (Lighter blade H)
D	0.335	2 (Lighter blade D)	23 (Heavier blade D)
C	0.330	3 (Heavier blade C)	24 (Lighter blade C)
B	0.325	4 (Lighter blade B)	25 (Heavier blade B)
F	0.320	5 (Heavier blade F)	26 (Lighter blade F)
E	0.315	6 (Lighter blade E)	27 (Heavier blade E)
T	0.310	7 (Heavier blade T)	28 (Lighter blade T)
A	0.305	8 (Lighter blade A)	29 (Heavier blade A)
R	0.300	9 (Heavier blade R)	30 (Lighter blade R)
J	0.295	10 (Lighter blade J)	31 (Heavier blade J)
P	0.290	11 (Heavier blade P)	32 (Lighter blade P)
L	0.285	12 (Lighter blade L)	33 (Heavier blade L)
N	0.280	13 (Heavier blade N)	34 (Lighter blade N)
M	0.275	14 (Lighter blade M)	35 (Heavier blade M)
O	0.270	15 (Heavier blade O)	36 (Lighter blade O)
K	0.265	16 (Lighter blade K)	37 (Heavier blade K)
Q	0.260	17 (Heavier blade Q)	38 (Lighter blade Q)
I	0.255	18 (Lighter blade I)	39 (Heavier blade I)
S	0.250	19 (Heavier blade S)	40 (Lighter blade S)
G	0.245	20 (Lighter blade G)	41 (Heavier blade G)
U	0.240	21 (Heavier blade U)	42 (Lighter blade U)

(5) Place heavier blade from second pair in a position just below lighter blade from first pair. See columns (3) and (4) in table 2.

(6) Working from largest weight difference to smallest difference continue alternating light and heavy blades as shown in table 2 until all blades have been positioned into two rows.

(7) Using temporary marking procedure, mark blades with sequence numbers. Identify heavier blade from first pair as Number 1. Identify lighter blade from second pair as Number 2. Number remaining blades in that row. See column (3) in table 2.

(8) After first row has been marked, assign next higher number to lighter blade from first pair. Continue marking blades in sequence. See column(4) in table 2.

WORK PACKAGE

INTRODUCTION

INLET/FAN MODULE -

FINAL ASSEMBLY

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2					0

T.O. 2J-F100-53-6

WP 700 00

1. INTRODUCTION.

- a. This work package introduces the 700 00 through 799 00 series of work packages for the Inlet/Fan Module subassemblies. The following work packages are included in this series:

WP No.	Title
701 00	Blades, Compressor Rotor, First Through Third Stages - Installation
702 00	Inlet/Fan Module - Assembly
703 00	Open
704 00	External Parts, Inlet/Fan Module - Installation
705 00	Compressor Inlet Variable Vane (CIVV) Cylinder System - Rigging
706 00	Rotor and Stator Assembly, Front Compressor - Dynamic Balancing
707 00 through 799 00	Open

WORK PACKAGE**TECHNICAL PROCEDURES****BLADES, COMPRESSOR ROTOR,
FIRST THROUGH THIRD STAGES -****INSTALLATION****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 44

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	20	16	0	21	20
2A Added	20	16A	13	22	7
2B Blank Added	20	16B Blank	5	23 - 24	20
3 - 4A	20	17	5	24A - 24B Added	20
4B Blank Added	8	18	0	25 - 26	20
5 - 6	20	19 - 20	20	26A Added	8
6A - 6B Added	20	20A - 20C Added	20	26B Blank Added	8
7 - 12	20	20D Blank Added	20	27	0
13 - 15	15			28	5

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Introduction And General Information - - - - -	T.O. 2J-F100-53-1
General Repair Procedures - Antigalling Compound Application (PWA 36545) - - - - -	SWP 098 07
Wrench, Hydraulic, PWA 50308 - - - - -	T.O. 32B14-5-2-1

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

T. O. No.	Date	Level	Title (ECP No.)
T.O. 2J-F100229-546	30 SEP 95	O/I	Modification of Retainer Ball Lock Pin Handle PWA 57614, F100-PW-229 Engine, F-15/F-16 Aircraft (ECP 93QC038)
T.O. 2J-F100229(I)-515	15 OCT 96	O/I	Retrofit of PN 4081566 First Stage Fan Shroud Featuring a Tighter Fit, F100-PW-229 Engine, F15/F-16 Aircraft (ECP 93QA034)

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
COMPOUND, ANTIGALLING (PWA 36545)	ESNALUBE 382
COMPOUND, ANTIGALLING (PWA 550)	HI-T-650 OR LUBRI-BOND HT
PETROLATUM	VV-P-236

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
COLLAR, RIVET PIN	4063974	44
PIN, RIVET	4018949	24
PIN, RIVET	ST2141-04	10
PIN, RIVET	ST2141-08	10

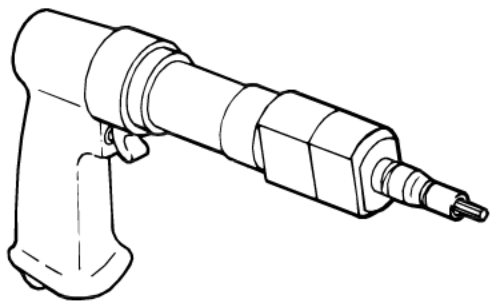
APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2	OUTER FAN CASE AND THIRD STAGE FAN AIR SEAL - INSTALLATION	
	STAND, INLET/FAN MODULE, STORAGE AND DISASSEMBLY -	PWA 56338
	RETAINER, INLET/FAN MODULE REAR HANDLING - - - - -	PWA 57615
	HEATER, FAN CASE, SHROUD INSTALLATION, VARIOUS - -	PWA 57825
		OR
	HEATER, FAN CASE, SHROUD INSTALLATION - - - - -	PWA 57805
	CONTROL, HEATER - - - - -	PWA 61685
		OR
	CONTROL, HEATER - - - - -	PWA 25672
3	THIRD STAGE COMPRESSOR ROTOR BLADES - INSTALLATION	
	RETAINER, INLET/FAN MODULE, FRONT HANDLING - - - - -	PWA 57803
		OR
	RETAINER, INLET, FAN MODULE HANDLING, FRONT - - - - -	PWA 57614
	ADAPTER, LIFT AND TRUNNION (TWO REQUIRED) - - - - -	PWA 26147
	SLING, HANDLING - - - - -	PWA 56336
	HOOK, SAFETY (TWO REQUIRED) - - - - -	PWA 2388
	EYE, REAR FAN HUB, LIFTING - - - - -	PWA 57642
	WEDGE - - - - -	LM 1010
4	FIRST AND SECOND STAGE COMPRESSOR AIR SEALS - INSTALLATION	
	EYE, REAR FAN HUB, LIFTING - - - - -	PWA 57642
	ADAPTER, LIFT AND TRUNNION (TWO REQUIRED) - - - - -	PWA 26147
	SLING, HANDLING - - - - -	PWA 56336
	HOOK, SAFETY (TWO REQUIRED) - - - - -	PWA 2388
	HEATER, DRUM ROTOR, 2ND STAGE REAR AIR SEAL - - - - -	PWA 57683
	CONTROL, HEATER - - - - -	PWA 61685
	AIR DRIVER, HI, LOK/HI, TORQUE - - - - -	HLA 1051
5	SECOND STAGE COMPRESSOR STATOR ASSEMBLY AND SECOND STAGE FAN AIR SEAL - INSTALLATION	
	HEATER, FAN CASE, SHROUD INSTALLATION, VARIOUS - -	PWA 57825
		OR
	HEATER, FAN CASE, SHROUD INSTALLATION - - - - -	PWA 57805
	CONTROL, HEATER - - - - -	PWA 61685
		OR
	CONTROL, HEATER - - - - -	PWA 25672

APPLICABLE SUPPORT EQUIPMENT (continued)

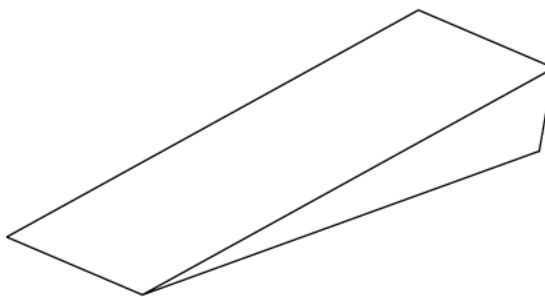
Paragraph	Function - Tool Nomenclature	Tool Number
6	SECOND STAGE COMPRESSOR ROTOR BLADES AND SECOND STAGE COMPRESSOR AIR SEAL - INSTALLATION	
	AIR DRIVER, HI, LOK/HI, TORQUE - - - - -	HLA 1051
7	FIRST STAGE COMPRESSOR STATOR ASSEMBLY AND FIRST STAGE FAN AIR SEAL - INSTALLATION	
	HEATER, FAN CASE, SHROUD INSTALLATION, VARIOUS - -	PWA 57825
		OR
	HEATER, FAN CASE, SHROUD INSTALLATION - - - - -	PWA 57805
	CONTROL, HEATER - - - - -	PWA 61685
		OR
	CONTROL, HEATER - - - - -	PWA 25672
	HEATER, NO. 5 BEARING OUTER RACE AND PLUG - - - - -	PWA 51932
	HEATER, NO. 5 BEARING OUTER RACE AND PLUG - - - - -	PWA 51932
8	FIRST STAGE COMPRESSOR ROTOR BLADES AND FRONT COMPRESSOR INLET AIR SEAL - INSTALLATION	
	AIR DRIVER, HI, LOK/HI, TORQUE - - - - -	HLA 1051

ILLUSTRATED SUPPORT EQUIPMENT



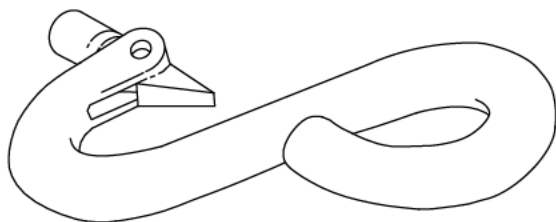
HLA 1051 -C

Figure T1. HLA 1051 AIR DRIVER



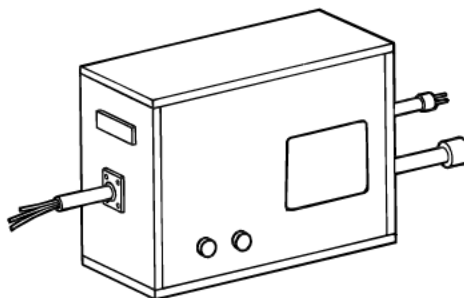
LM1010 -C

Figure T2. LM 1010 WEDGE



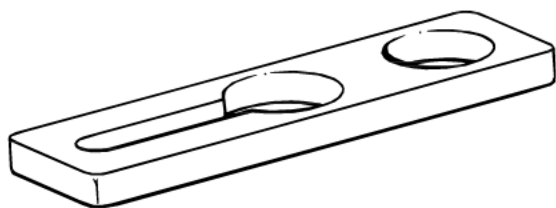
PWA 2388 -C

Figure T3. PWA 2388 HOOK



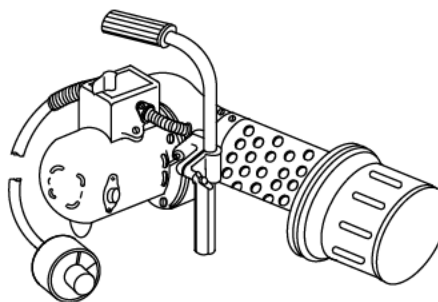
PWA 25672 -C

Figure T4. PWA 25672 CONTROL



PWA 26147 -C

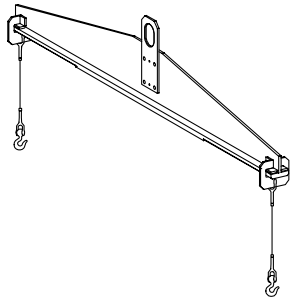
Figure T5. PWA 26147 ADAPTER



PWA 51932 -C

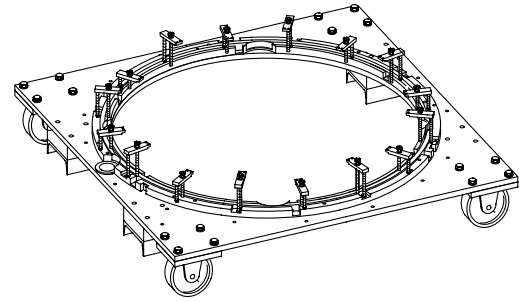
Figure T6. PWA 51932 HEATER

ILLUSTRATED SUPPORT EQUIPMENT (continued)



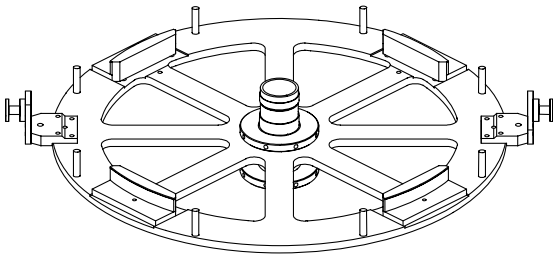
PWA 56336 -C

Figure T7. PWA 56336 SLING



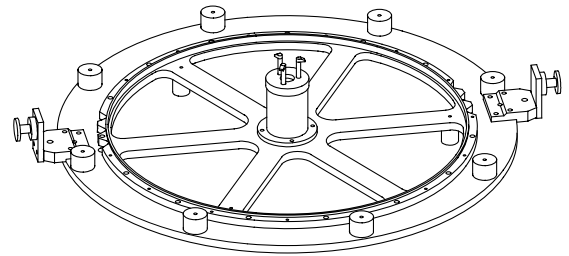
PWA 56338 -C

Figure T8. PWA 56338 STAND



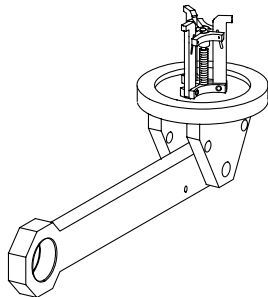
PWA 57614 -C

Figure T9. PWA 57614 RETAINER



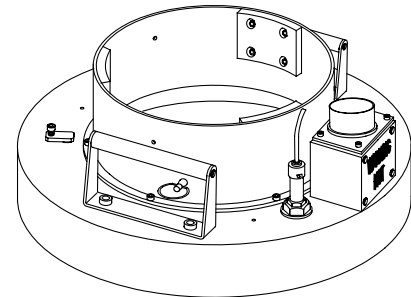
PWA 57615 -C

Figure T10. PWA 57615 RETAINER



PWA 57642

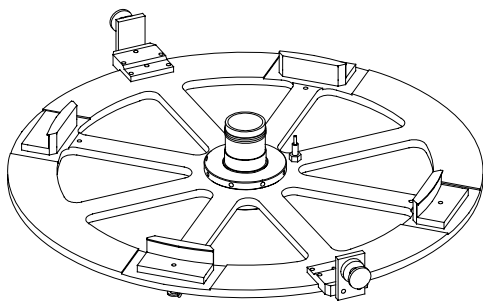
Figure T11. PWA 57642 EYE



PWA 57683 -C

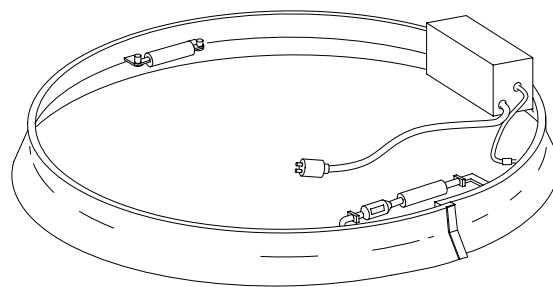
Figure T12. PWA 57683 HEATER

ILLUSTRATED SUPPORT EQUIPMENT (continued)



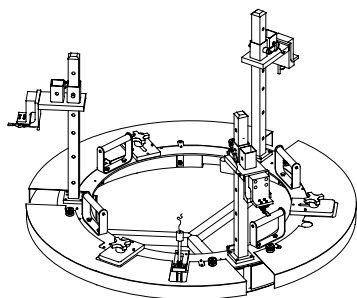
PWA 57803 -C

Figure T13. PWA 57803 RETAINER



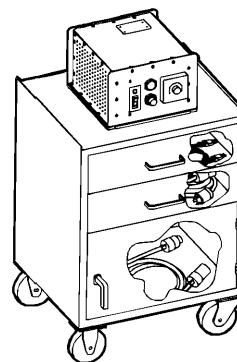
PWA 57805 -C

Figure T14. PWA 57805 HEATER



PWA 57825 -C

Figure T15. PWA 57825 HEATER



PWA 61685 -C

Figure T16. PWA 61685 CONTROL

1. INTRODUCTION.

- a. This work package contains instructions for installation of the inlet/fan module subassemblies from 3rd stage blades through 1st stage compressor rotor blades.
- b. Assembly is started in a vertical position with drum rotor in a front up position.
- c. After 3rd stage blade installation is completed, remainder of assembly is done in a rear down position.

2. OUTER FAN CASE AND THIRD STAGE FAN AIR SEAL - INSTALLATION.

(See Figures 1 and 1A.)

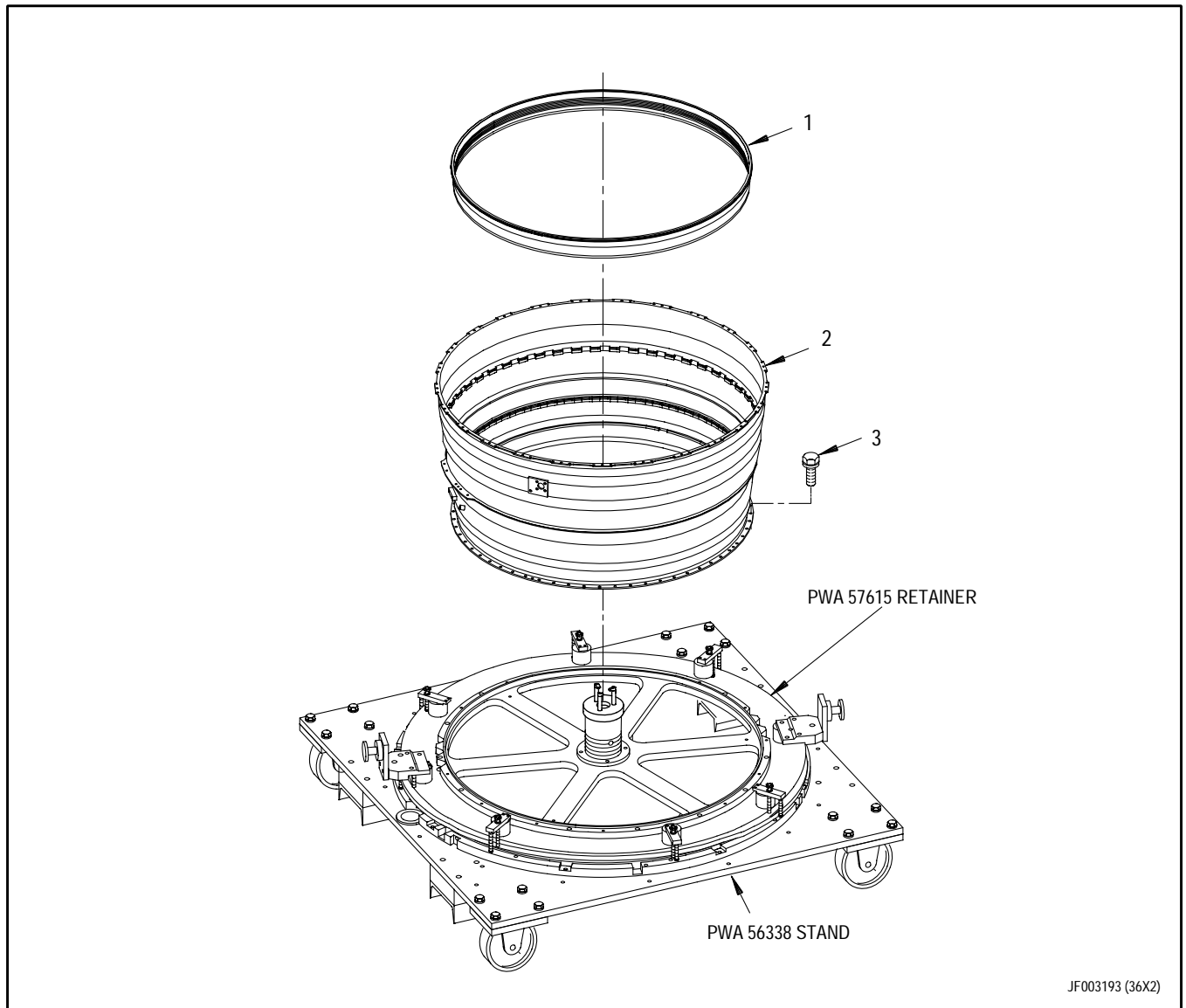
- a. Install 3rd stage fan air seal(1, figure 1) as follows:
 - (1) Ensure flat side of PWA 56338 detail-33 locating ring is facing up. Install PWA 57615 retainer onto PWA 56338 stand. Turn locking legs of inner detail inward to prevent interference with drum rotor assembly.
 - (2) Lift outer fan case(2) and place onto PWA 57615 rear retainer aligning dowel pin hole in case with dowel pin in retainer.
 - (3) Secure with cap screws(3).

NOTE

Fan case may be heated using PWA 57825 or PWA 57805 heater.

- (4) If installing PWA 57825 heater, use following steps:
(See figure 1A.)

- (a) Remove ball lock pins(1, figure 1A) and set clamp assemblies(10) to highest position on risers(11) and install ball lock pins(1). Make sure risers(11) are installed in socket position farthest from clamp.
- (b) Set toggle clamps(9) to full open position.
- (c) Loosen handknobs(2) on centering blocks(3) on top of heater and position each block so that number 1 aligns with mark on heater top plate.
- (d) Tighten handknobs(2) on centering blocks(3).
- (e) Loosen handknob(6) on thermocouple block(7) and pull back to full retracted position.
- (f) Position PWA 57825 heater in fan case by locating clamp assemblies(10) on forward flange of fan case and closing toggle clamps(9) on flange in order to lock.
- (g) Loosen handknobs(2) of centering blocks(3) slightly to allow for hand adjustment of blocks to full 3 point engagement of blocks in case. Tighten handknobs(2).

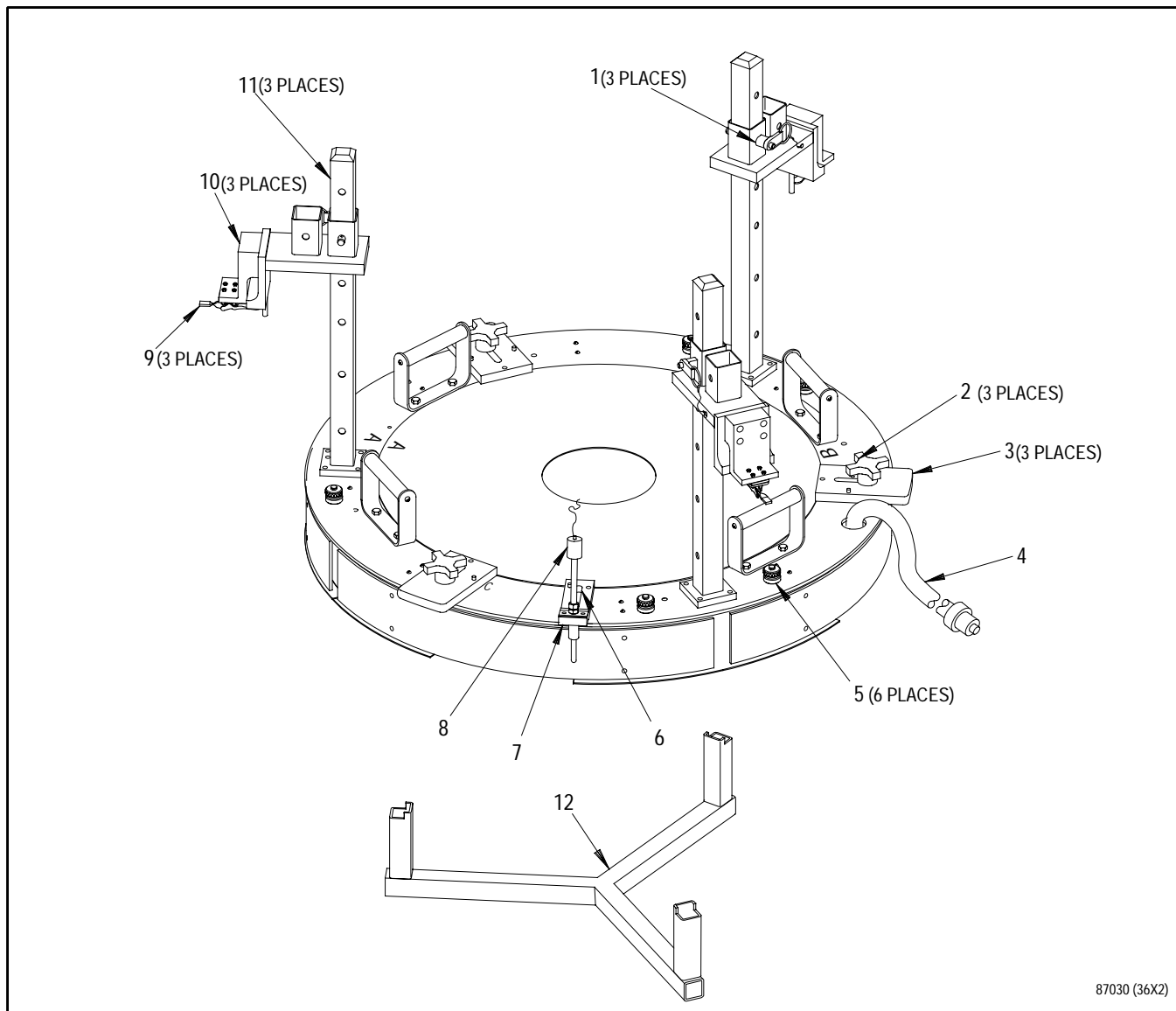


JF003193 (36X2)

1. Third stage fan air seal
2. Outer fan case
3. Cap screw assembly

Figure 1. Outer Fan Case and Third Stage Fan Air Seal - Installation

- | | |
|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <p>(h) Adjust thermocouple block(7) to contact fan case with tip of thermocouple(8). Tighten handknob(6).</p> | <p>(i) Connect thermocouple cable of PWA 61685 heater controller to thermocouple(8) probe of heater.</p> |
|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|



87030 (36X2)

Legend for Figure 1A

- | | |
|--------------------|-----------------------|
| 1. Ball Lock Pin | 7. Thermocouple Block |
| 2. Handknob | 8. Thermocouple |
| 3. Centering Block | 9. Toggle Clamp |
| 4. Power Cable | 10. Clamp Assembly |
| 5. Knurled Knob | 11. Riser |
| 6. Handknob | 12. Stand Assembly |

Figure 1A. PWA 57825 Heater - Installation (Typical)

- (j) Connect power cable(4) to PWA 61685 heater controller and turn controller power On.



Exceeding maximum specified temperature will damage fan case.

- (k) Set heater controller to heat fan case from 225° to 275°F (107° to 135°C).
- (l) Allow fan case to reach temperature between 225° and 275°F then maintain temperature for 5 minutes. Do not exceed 425°F (218°C).
- (m) After maintaining temperature for 5 minutes, turn heater controller power Off and set controller set point to 0°F.
- (n) Open toggle clamps(9) to release heater from fan case flange and remove heater from case.



Failure to use caution when setting heater down may result in damage to heating elements.

- (o) Place heater on stand assembly(12) to prevent damage to flooring.
- (5) If installing PWA 57805 heater, use the following steps:
 - (a) Disengage detail-8 ball lock pin and slide detail-11 handle on detail-17 arm to free linkage.
 - (b) Install heater into fan case with temperature control box facing up.

- (c) Install heater band into area of case to be heated and expand band to approximate fit.

- (d) Lock band into position by inserting detail-8 ball lock pin through detail-3 arm and detail-2 locator.

- (e) Slide detail-11 slide handle over detail-17 arm and snug heater band to case by turning detail-30 turnbuckle nut.

- (f) Attach grounding strap to fan case.



Exceeding maximum specified temperature will damage fan case.

- (g) Set temperature control at 350°F (177°C). Heat 3rd stage fan air seal mating area of outer fan case(2) to 225°F (107°C) to 275°F (135°C). Do not exceed 425°F (218°C).

- (h) Remove heater by sliding detail-11 handle on detail-17 arm exposing connecting link.

- (i) Pull handle toward center of heater and remove heater from fan case.



To prevent 3rd stage fan air seal from cracking during installation, be careful not to chip or dent air seal.

- (6) Install 3rd stage fan air seal(1, figure 1) by aligning lugs on seal with slots in case(2). Tap to seat using plastic mallet and fiber drift.

- (7) Remove cap screws(3) and remove fan case from rear retainer.

3. THIRD STAGE COMPRESSOR ROTOR BLADES - INSTALLATION.

(See Figures 1B and 1C.)

- a. Install PWA 57803 retainer onto front of drum rotor assembly. See figure 1B.

- (1) Thread detail-3 nut onto detail-2 shaft until bottom of nut is approximately one inch above end of threads on shaft detail. Ensure shaft retainer detail-2 does not extend more than one inch above detail-3 nut. Detail damage can occur.

- (2) Install detail-2 shaft and lower detail-3 nut onto drum rotor front hub.

NOTE

PWA 57803 retainer contains PWA 57614 details.

- (3) Two technicians are required for installation of PWA 57614 detail-1. Attach PWA 26147 lifting adapters, PWA 56336 sling, PWA 2388 safety hook and overhead hoist to PWA 57614 detail-1 base.

- (4) Install detail-1 base slide jaw details facing down onto shaft detail.

- (5) Raise lower nut detail and base detail until feet on base detail are above shaft detail. Secure with upper nut detail-3.

- b. Lift drum rotor assembly and install PWA 57642 lifting eye to drum rotor assembly.
- c. Connect lifting eye to a second PWA 2388 hook and suitable hoist.
- d. Rotate drum rotor assembly and position front end down.
- e. Remove sling from front retainer and carefully lower drum rotor onto work stand and secure.

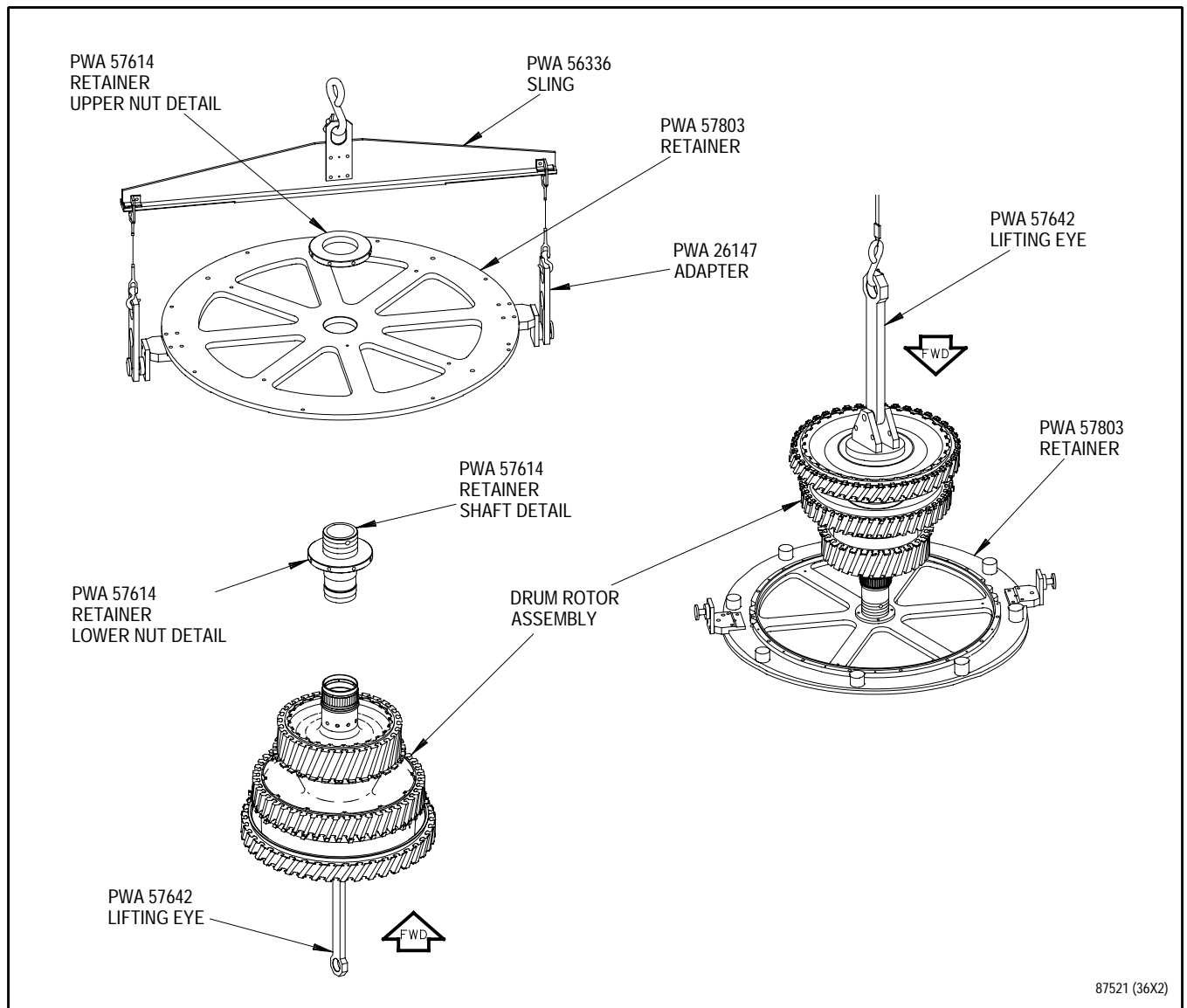


Figure 1B. Figure 1B. Drum Rotor Assembly - Positioning to Front End Down

NOTE

- The 3rd stage compressor rotor blades may be transferred only from a module with greater total low cycle fatigue (LCF) cycles remaining to the next scheduled depot visit to a module with less total low cycle fatigue cycles remaining to next scheduled depot visit.
 - Blades are moment-weighted and are replaced in sets. A blade set consists of two blades within 0.200 ounce-inch of same moment-weight. If any blade is to be replaced, matched blade, 180 degrees away, shall also be replaced.
- f. Install previously removed 3rd stage compressor rotor blades(1, figure 1C) as follows:

NOTE

For installation of a complete set of blades refer to step g.

- (1) Lay out blades in order of installation to facilitate assembly.
- (2) Match numbers marked on blades with numbers on disk and install blades part way into disk slots. If any blade is to be replaced, ensure that matched blade, 180 degrees away, is also replaced.

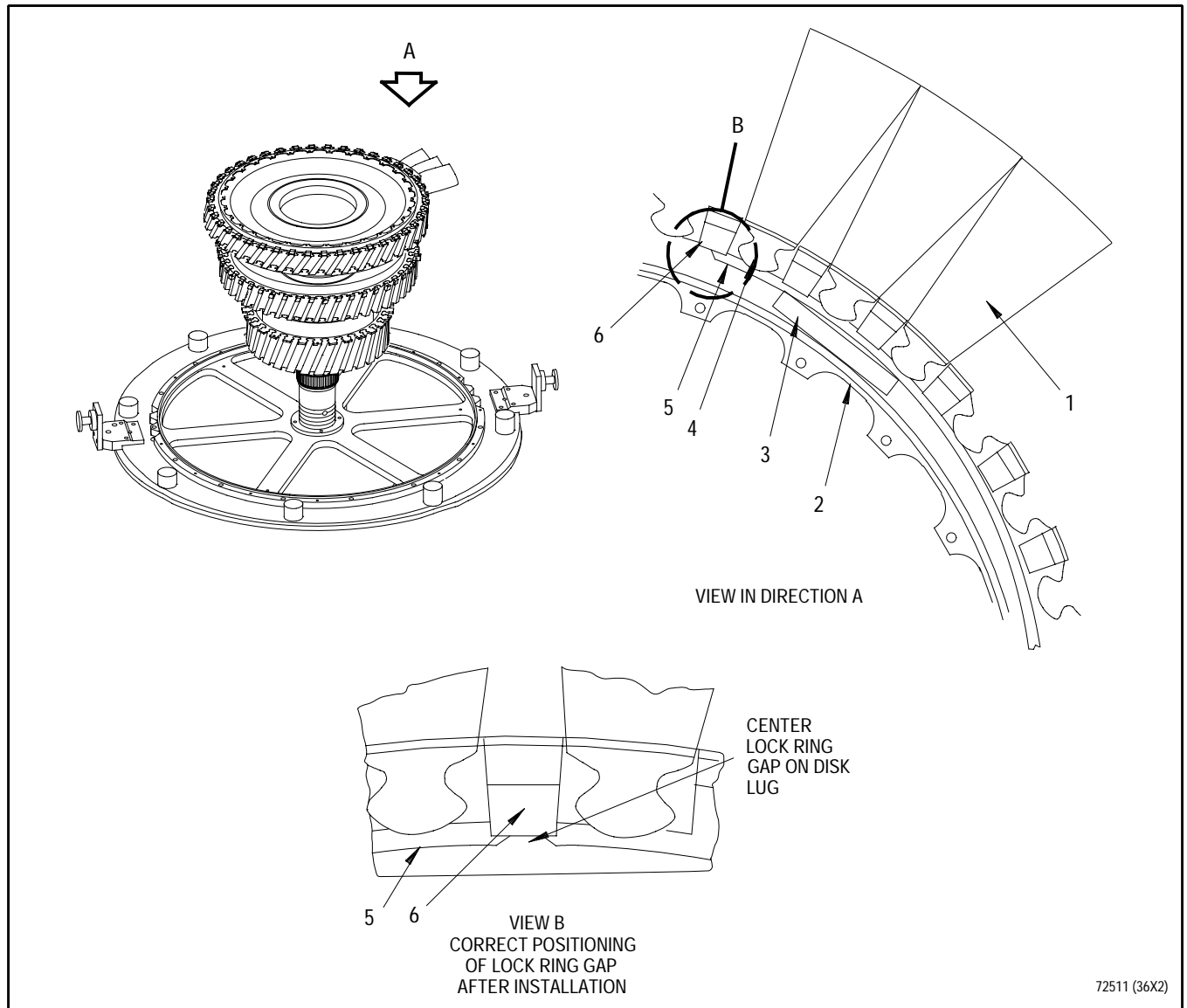
g. Install a complete set of 3rd stage compressor blades as follows:

- (1) Select moment-weighted blades per WP 604 00.
- (2) Lay out blades in order of installation to facilitate assembly.

NOTE

No. 1 blade slot location is random and is determined by installation of No. 1 blade.

- (3) Install blades two at a time into disk in a clockwise direction with leading (longer edges) edges of blades facing toward front of disk. Ensure that blades are installed in disk with correct orientation. Slots on blade root shall face rearward. Tape tips of blades together.
- (4) Mark location of No. 1 blade on forward side for easy identification when rotor is turned over.



72511 (36X2)

1. Third stage compressor rotor blade
2. Drum rotor
3. LM 1010 wedge
4. Blade slot
5. Third stage compressor rotor blade lock ring
6. Disk lug

Figure 1C. Third Stage Compressor Rotor Blades - Installation

- h. Install 3rd stage compressor blade lock ring (5, figure 1C) into disk(6) and blade(4) slots as follows:



Failure to ensure that 3rd stage compressor blade lock ring is properly installed can result in blade loss during engine operation.

NOTE

To ease installation, lock ring(5) should remain flat against drum rotor(6) throughout installation procedure, and aft of blade platform shall be level with outer diameter of disk lug.

- (1) Install end of lock ring(5) under a disk lug(6). Install remainder of ring.
- (2) Ensure center of lock ring gap is positioned at disk lug center.
- (3) Install three blades(1) onto lock ring(5). Then place LM 1010 wedge(3) between drum rotor(2) and lock ring(5) to hold ring in place.
- (4) Install lock ring(5) into blade slots(4) while other technician holds ring against previously installed blades.
- (5) Check center OD of lock ring gap for proper positioning. See figure 1C.

4. FIRST AND SECOND STAGE COMPRESSOR AIR SEALS - INSTALLATION.

(See Figures 2 through 5.)

- a. Carefully install PWA 57642 lifting eye to rear of drum rotor assembly. (See figure 2.)
- b. Attach PWA 26147 lifting adapters, PWA 56336 sling, PWA 2388 safety hook, and overhead hoist onto PWA 57803 front retainer.
- c. Carefully lift drum rotor assembly.

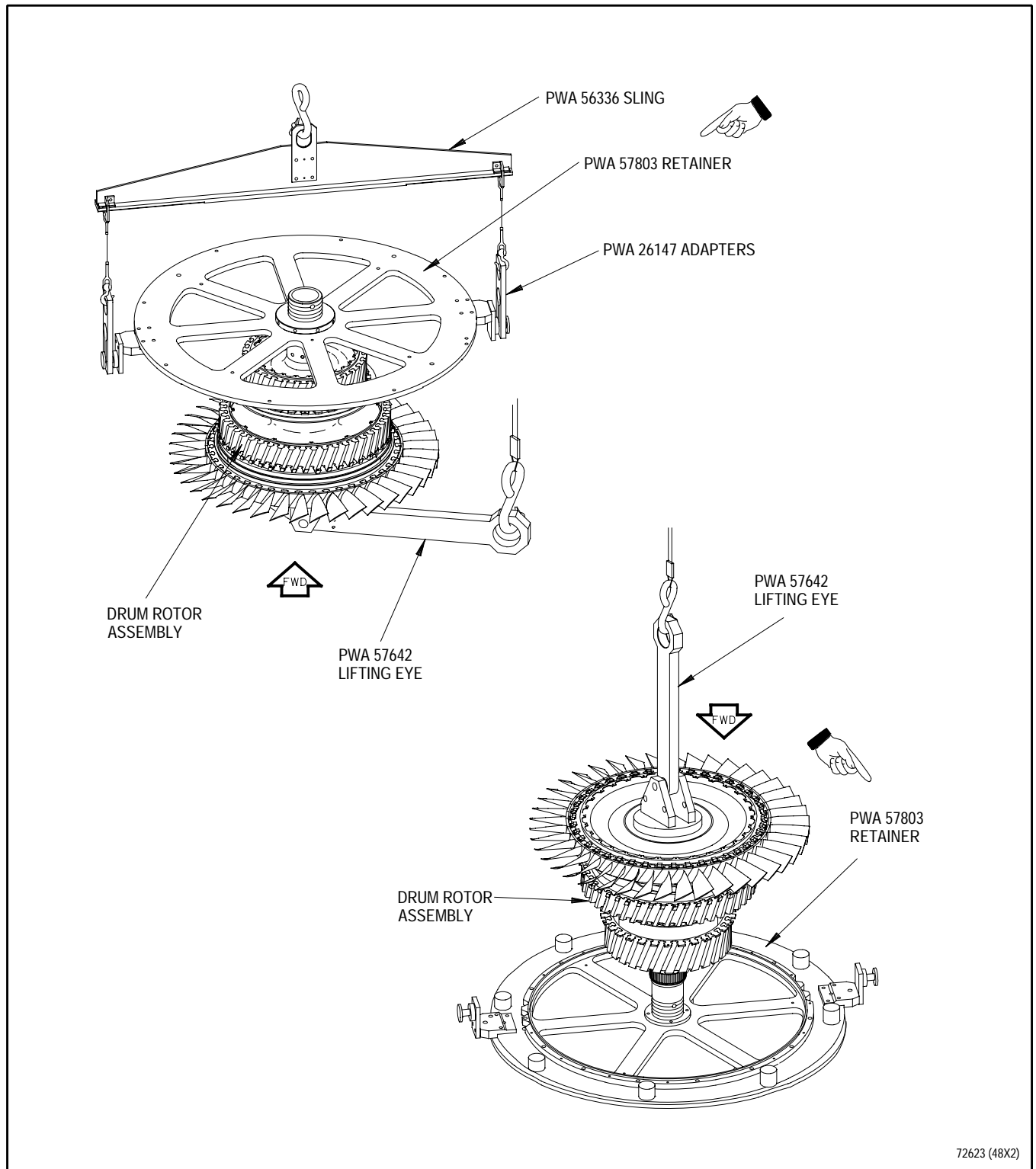


Figure 2. Drum Rotor Assembly - Removal From PWA 57614 Front Handling Retainer and PWA 56338 Stand

- d. Rotate drum rotor assembly to front end up position. (See figure 3.)
- e. Remove PWA 57642 rear lifting eye, hook, and hoist.
- f. Turn locking legs of inner detail inward to prevent interference with drum rotor assembly. (See figure 3.)



Failure to ensure that drum rotor assembly is aligned with inner detail of PWA 57615 rear retainer before lowering assembly can result in damage to assembly.

- g. Align drum rotor assembly with of PWA 57615 rear retainer inner detail. Carefully lower assembly until rear of drum rotor assembly rests on inner detail.
- h. Turn locking legs of inner detail outward to secure drum rotor assembly.
- i. Remove PWA 57803 front retainer.
- j. Install 2nd stage compressor front air seal(3, figure 4) as follows:
 - (1) Remove protector from 2nd stage compressor air seal.
 - (2) Install PWA 57683 heater as follows:
 - (a) Install PWA 57683 heater detail-40 guide onto rotor until nylon pads bottom on 1st stage disk lugs.
 - (b) Remove thermocouple from heater assembly.
 - (c) Carefully install heater over guide and 2nd stage disk, clearing 10 large lugs of disk.
 - (d) After heater is located and seated on 2nd stage disk lock heater in place by turning clockwise until rotating action is stopped.
 - (e) Ensure heater is locked in place by pulling upward on handles.

NOTE

A slight spring tension should be felt during thermocouple installation.

- (f) Install thermocouple into heater and lock in place. Ensure that heater thermocouple contacts surface being heated. If spring tension is not felt repeat step (c).

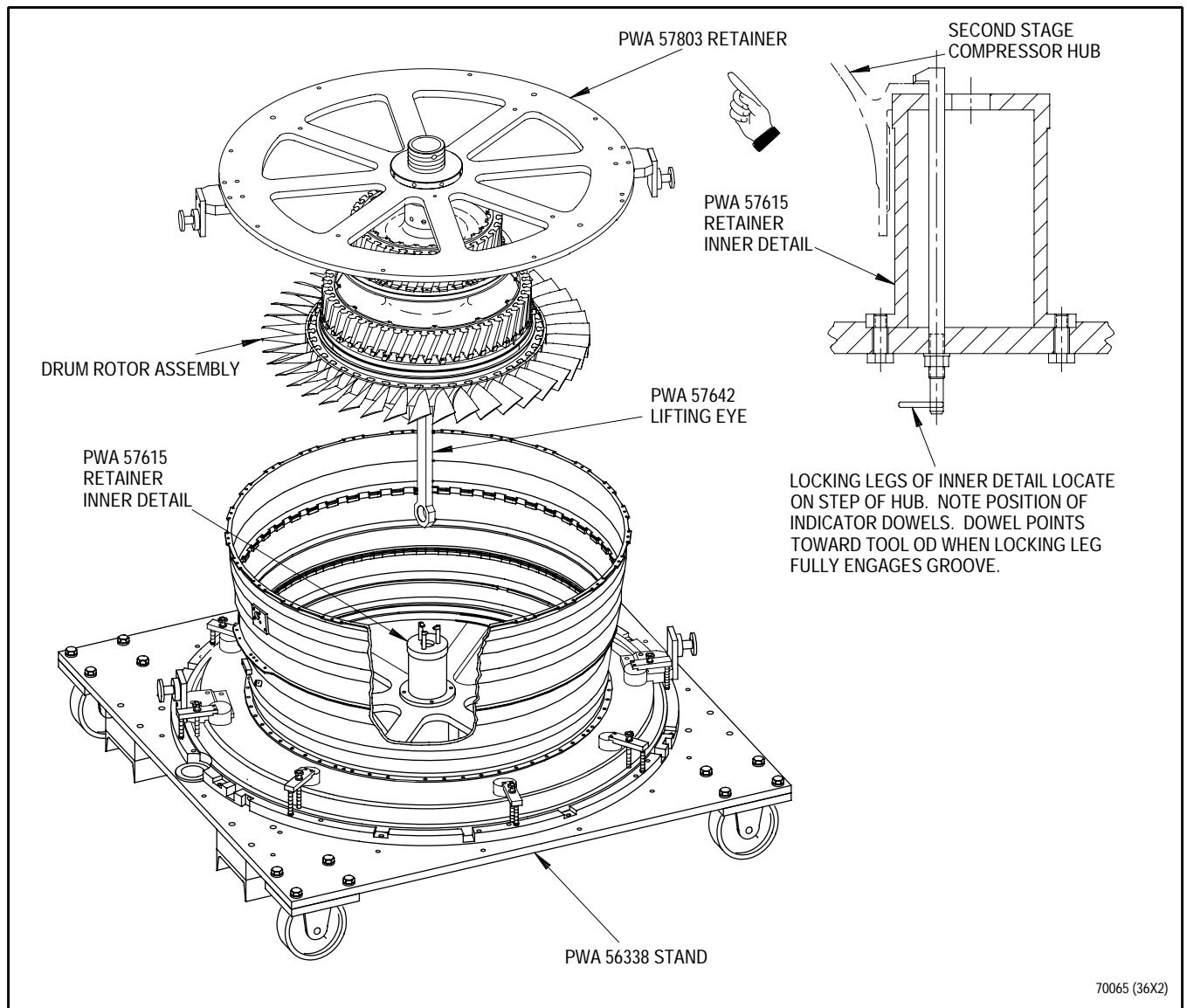
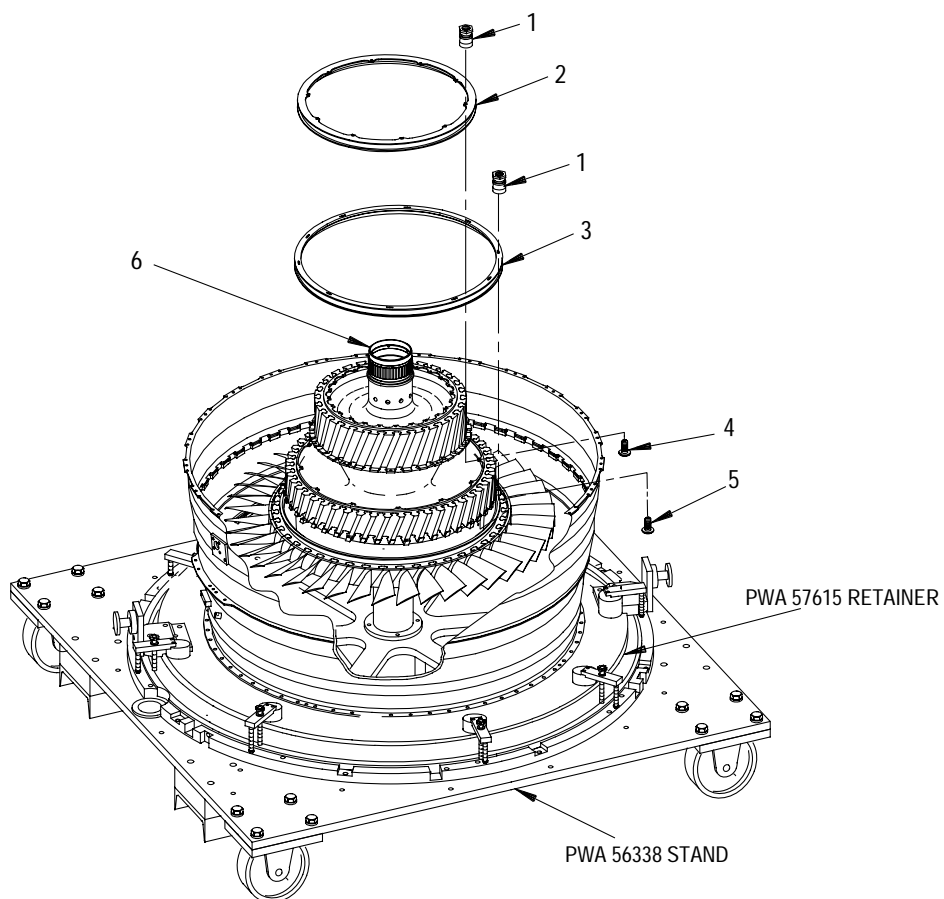


Figure 3. Drum Rotor Assembly - Installation Onto PWA 57615 Rear Retainer and PWA 56338 Stand



JF003191 (36X2)

1. Rivet pin collar
2. First stage compressor front air seal
3. Second stage compressor front air seal
4. Rivet pin (ST2141-04)
5. Rivet pin (ST2141-08)
6. Drum rotor assembly

Figure 4. First and Second Stage Compressor Air Seals - Installation

- (3) Connect heater to PWA 61685 heater control. Set temperature at 300°F (149°C). Connect control to power source.
- (4) Place 2nd stage compressor air seal(3) in freezer for approximately 10 minutes or until it reaches 40°F (4°C).
- (5) Heat 2nd stage compressor rotor area of drum rotor to 300°F (149°C). Then turn control to off position remove thermocouple and remove heater by turning counterclockwise.
- (6) Install 2nd stage compressor rear air seal(3) flange side up, aligning rivet holes.
- (7) Using phenolic drift and mallet, lightly tap air seal(3) in various locations until seated.
- (8) Install work bolts in rivet holes immediately following airseal installation to ensure parts are seated. Use opposite pattern to torque work bolts.
- (9) Allow parts to normalize (approximately 15 minutes).
- (10) Remove work bolts.
- (11) Install new rivet pins(5) and rivet pin collars(1) with rivet heads against drum rotor assembly(6).

NOTE

Wrenching flat of collar will shear off when proper torque is reached.

- (12) Using opposite pattern, torque collars using HLA 1051 air driver or hexagon wrench and open end wrench per figure 5.
- (13) Check for proper installation by using finger pressure to try to rotate pin and collar. If pin and collar rotate, they are improperly installed and must be replaced.

- k. Install 1st stage compressor front air seal(2, figure 4) as follows:
- (1) Remove protector from 1st stage compressor air seal.
 - (2) Heat air seal in oven at 250°F (121°C) for 15 minutes.
 - (3) Install heated air seal onto rear of 1st stage of drum rotor assembly(6) flange side up, aligning rivet holes.
 - (4) Using phenolic drift and mallet, lightly tap air seal(2) in various locations until seated.
 - (5) Install new rivet pins(4) and rivet pin collars(1) with rivet pin heads against drum rotor assembly(5).

NOTE

Wrenching flat of collar will shear off when proper torque is reached.

- (6) Using opposite pattern torque collars using HLA 1051 air driver or hexagon wrench and open end wrench. (See figure 5.)
- (7) Check for proper installation by using finger pressure to try to rotate pin and collar. If pin and collar rotate, they are improperly installed and must be replaced.

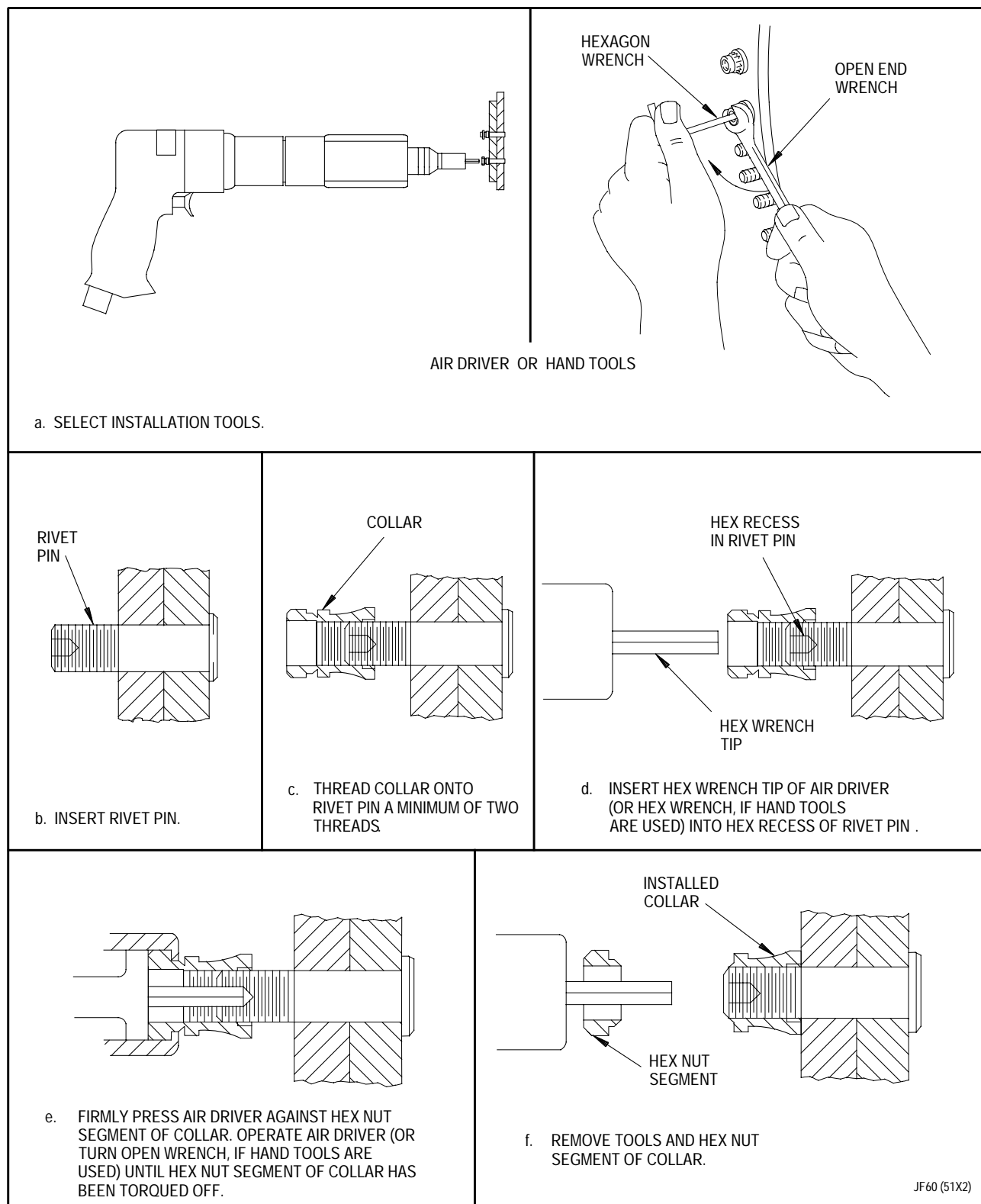


Figure 5. Rivet Pin and Collar Installation Procedure

5. SECOND STAGE COMPRESSOR STATOR ASSEMBLY AND SECOND STAGE FAN AIR SEAL - INSTALLATION.

(See figure 1A and Figure 6.)

- a. Install 2nd stage compressor stator assembly(3, figure 6) as follows:

NOTE

Fan case may be heated using PWA 57825 or PWA 57805 heater.

- (1) If installing PWA 57825 heater, refer to figure 1A and use following steps:

- (a) Remove ball lock pins(1, figure 1A) and set clamp assemblies(10) to second highest position on risers(11) and install ball lock pins(1). Make sure risers(11) are installed in socket position farthest from clamp.
- (b) Set toggle clamps(9) to full open position.
- (c) Loosen handknobs(2) on centering blocks(3) on top of heater and position each block so that number 2 aligns with mark on heater top plate.
- (d) Tighten handknobs(2) on centering blocks(3).
- (e) Loosen handknob(6) on thermocouple block(7) and pull back to full retracted position.
- (f) Position PWA 57825 heater in fan case by locating clamp assemblies(10) on forward flange of fan case and closing toggle clamps(9) on flange in order to lock.

- (g) Loosen handknobs(2) of centering blocks(3) slightly to allow for hand adjustment of blocks to full 3 point engagement of blocks in case. Tighten handknobs(2).

- (h) Adjust thermocouple block(7) to contact fan case with tip of thermocouple(8). Tighten handknob(6).

- (i) Connect thermocouple cable of PWA 61685 heater controller to thermocouple(8) probe of heater.

- (j) Connect power cable(4) to PWA 61685 heater controller and turn controller power On.



Exceeding maximum specified temperature will damage fan case.

- (k) Set heater controller to heat fan case from 225° to 275°F (107° to 135°C).
- (l) Allow fan case to reach temperature between 225° and 275°F then maintain temperature for 5 minutes. Do not exceed 425°F (218°C).
- (m) After maintaining temperature for 5 minutes, turn heater controller power Off and set controller set point to 0°F.
- (n) Open toggle clamps(9) to release heater from fan case flange and remove heater from case.

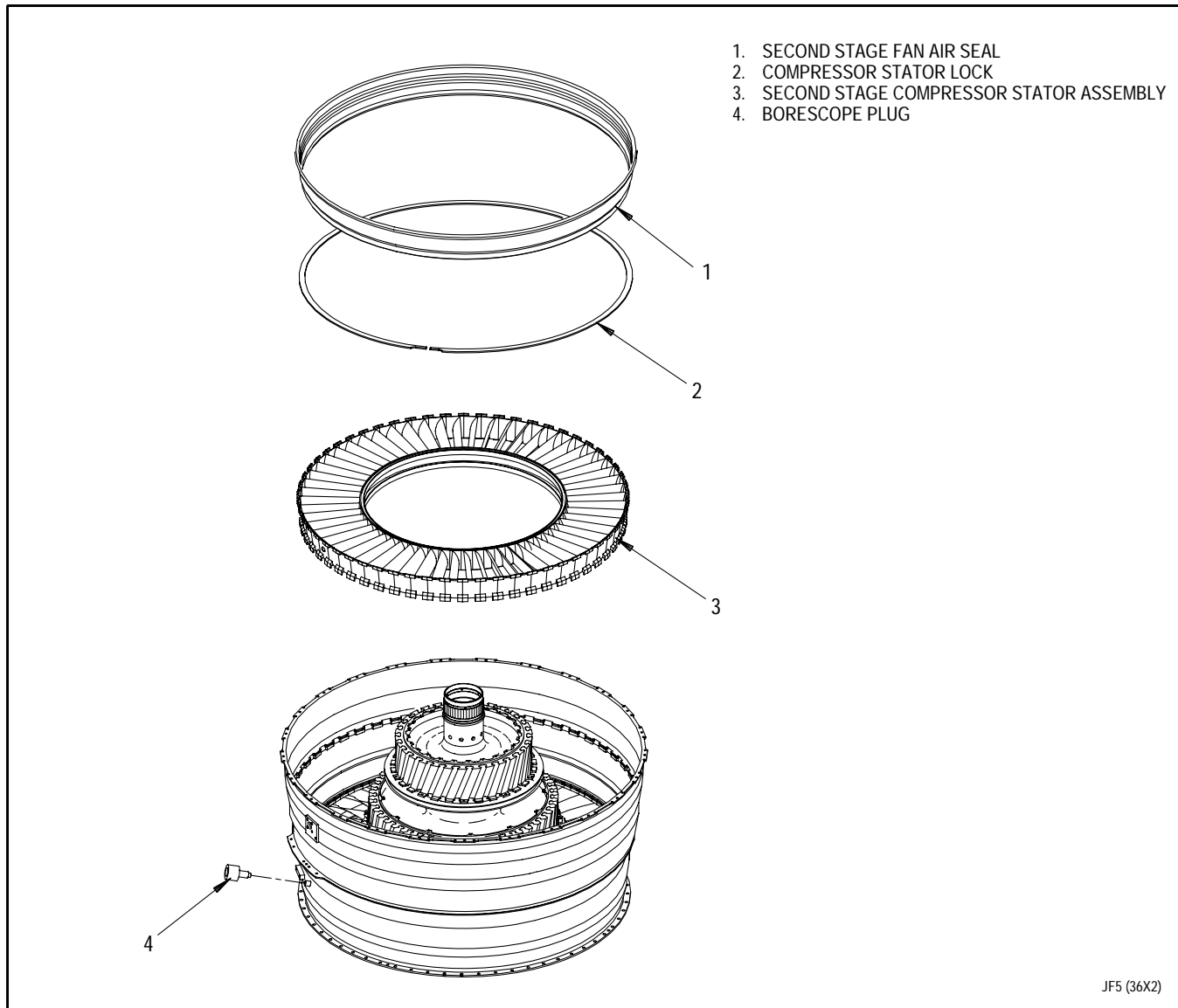


Figure 6. Second Stage Compressor Stator Assembly and Second Stage Fan Air Seal - Installation



Failure to use caution when setting heater down may result in damage to heating elements.

(o) Place heater on stand assembly(12) to prevent damage to flooring.

(2) If installing PWA 57805 heater, use following steps:

(a) Disengage detail-8 ball lock pin and slide detail-11 handle on detail-17 arm to free linkage.

(b) Install heater into fan case with temperature control box facing up.

- (c) Install heater band into area of case to be heated and expand band to approximate fit.
 - (d) Lock band into position by inserting detail-8 ball lock pin through detail-3 arm and detail-2-2 locator.
 - (e) Slide detail-11 slide handle over detail-17 arm and snug heater band to case by turning detail-30 turnbuckle nut.
 - (f) Attach grounding strap to fan case.
 - (6) Install compressor stator lock(2), ensuring gap is between stator case slots.
 - (7) Lightly coat borescope plug(4) threads with PWA 550 antigalling compound and install plug into fan case boss.
 - (8) Torque borescope plug 460 to 515 pound-inches.
- b. Install second stage fan air seal(1) as follows:



Fan case may be heated using PWA 57825 or PWA 57805 heater.



Exceeding maximum specified temperature will damage fan case.

- (g) Set temperature control at 350°F (177°C). Heat 2nd stage stator assembly mating area of outer fan case to 225°F (107°C) to 275°F (135°C). Do not exceed 425°F (218°C)
 - (h) Remove heater by sliding detail-11 handle on detail-17 arm exposing connecting link.
 - (i) Pull handle toward center of heater and remove heater from fan case.
- (3) Apply VV-P-236 petrolatum on rubber seal inner surface of 2nd stage compressor stator assembly.
- (4) Install 2nd stage compressor stator assembly(3, figure 6) into outer fan case aligning offset lug on stator with offset slot in fan case.
- (5) Tap case of stator assembly with fiber mallet and drift to seat.
- (1) If installing PWA 57825 heater, use following steps: (See figure 1A.)
- (a) Remove ball lock pins(1, figure 1A) and set clamp assemblies(10) to third highest position on risers(11) and install ball lock pins. Make sure risers(11) are installed in socket position farthest from clamp.
 - (b) Set toggle clamps(9) to full open position.
 - (c) Loosen handknobs(2) on centering blocks(3) on top of heater and position each block so that number 3 aligns with mark on heater top plate.
 - (d) Tighten handknobs(2) on centering blocks(3).
 - (e) Loosen handknob(6) on thermocouple block(7) and pull back to full retracted position.

- (f) Position PWA 57825 heater in fan case by locating clamp assemblies(10) on forward flange of fan case and closing toggle clamps(9) on flange in order to lock.
- (g) Loosen handknobs(2) of centering blocks(3) slightly to allow for hand adjustment of blocks to full 3 point engagement of blocks in case. Tighten handknobs(2).
- (h) Adjust thermocouple block(7) to contact fan case with tip of thermocouple(8). Tighten handknob(6).
- (i) Connect thermocouple cable of PWA 61685 heater controller to thermocouple(8) probe of heater.
- (j) Connect power cable(4) to PWA 61685 heater controller and turn controller power On.



Exceeding maximum specified temperature will damage fan case.

- (k) Set heater controller to heat fan case from 225° to 275°F (107° to 135°C).
- (l) Allow fan case to reach temperature between 225° and 275°F then maintain temperature for 5 minutes. Do not exceed 425°F (218°C).

- (m) After maintaining temperature for 5 minutes, turn heater controller power Off and set controller set point to 0°F.

- (n) Open toggle clamps(9) to release heater from fan case flange and remove heater from case.



Failure to use caution when setting heater down may result in damage to heating elements.

- (o) Place heater on stand assembly(12) to prevent damage to flooring.
- (2) If using PWA 57805 heater, install per following steps:
 - (a) Disengage detail-8 ball lock pin and slide detail-11 handle on detail-17 arm to free linkage.
 - (b) Install heater into fan case with temperature control box facing up.
 - (c) Install heater band into area of case to be heated and expand band to approximate fit.
 - (d) Lock band into position by inserting detail-8 ball lock pin through detail-3 arm and detail-2-2 locator.
 - (e) Slide detail-11 slide handle over detail-17 arm and snug heater band to case by turning detail-30 turnbuckle nut.
 - (f) Attach grounding strap to fan case.



Exceeding maximum specified temperature will damage fan case.

- (g) Set temperature control at 350°F (177°C). Heat 2nd stage fan air seal mating area of outer fan case to 225°F (107°C) to 275°F (135°C). Do not exceed 425°F (218°C).
- (h) Remove heater by sliding detail-11 handle on detail-17 arm exposing connecting link.

- (i) Pull handle toward center of heater and remove heater from fan case.



To prevent 2nd stage fan airseal from cracking, be careful not to chip or dent airseal during installation.

- (3) Remove protective covering from air seal and install into outer fan case aligning offset lug on seal with offset slot in fan case. Tap air seal with fiber mallet to seat.

6. SECOND STAGE COMPRESSOR ROTOR BLADES AND SECOND STAGE COMPRESSOR AIR SEAL - INSTALLATION.

(See figure 5, and Figure 7.)

NOTE

- The 2nd stage compressor rotor blades may be transferred only from a module with greater total low cycle fatigue (LCF) cycles remaining to the next schedule depot visit to a module with less total low cycle fatigue cycles remaining to the next schedule depot visit.
 - Blades are moment-weighed and are replaced in sets. A blade set consists of two blades within 0.200 ounce-inch of same moment-weight. If any blade is to be replaced, matched blade, 180 degrees away, shall also be replaced.
- a. Install previously removed 2nd stage compressor rotor blades(4, figure 7) as follows:

NOTE

For installation of a complete set of blades refer to step b.

- (1) Match numbers marked on blades with numbers on disk and install blades part way into disk in a counterclockwise direction, with leading (longer) edges of blades facing toward front of disk. Ensure that blades are installed in disk with correct orientation. If any blade is to be replaced, ensure that matched blade, 180 degrees away, is also replaced.
- (2) Seat blades using a rubber mallet.

b. Install a complete set of 2nd stage compressor rotor blades(4, figure 7) as follows:

- (1) Select moment-weighted blades per WP 604 00.
- (2) Lay out blades in order of assembly to facilitate assembly. Mark No. 1 blade for ease of identification.
- (3) Install blades partially into disk in a counterclockwise direction, with leading (longer) edges of blades facing toward front of disk. Ensure seals are inside of blade flanges. Number 1 blade to be installed 120° from number 1 blade in 3rd stage in a counterclockwise direction.

(4) Seat blades using a rubber mallet.

c. Secure blades by installing first stage compressor rear air seal(3) as follows:

- (1) Remove protector and heat 1st stage compressor rear air seal(3) in oven at 200°F (93°C) for a minimum of 10 minutes.
- (2) Install heated 1st stage compressor air seal onto front of 2nd stage disk area at drum rotor assembly(5); aligning rivet holes.
- (3) Seat air seal using phenolic drift and mallet.

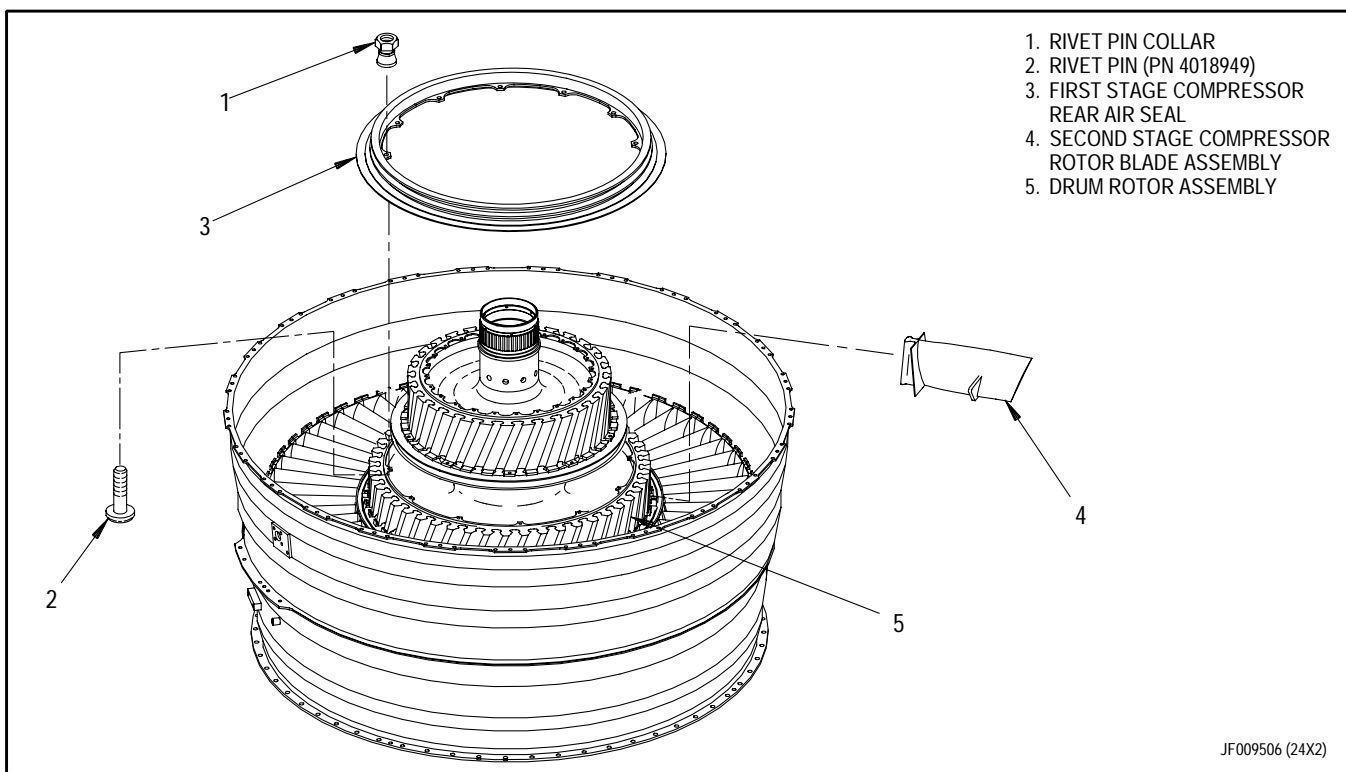


Figure 7. Second Stage Compressor Rotor Blades and Second Stage Compressor Air Seal - Installation

- (4) Install new rivet pins(2) and rivet pin collars(1) with rivet pin heads against drum rotor assembly(5).

NOTE

Wrenching flat of collar will shear off when proper torque is reached.

- (5) Using opposite pattern torque collars using HLA 1051 air driver or hexagon wrench and open end wrench. (See figure 5.)
- (6) Check for proper installation by using finger pressure to try to rotate pin and collar. If pin and collar rotate, they are improperly installed and must be replaced.

7. FIRST STAGE COMPRESSOR STATOR ASSEMBLY AND FIRST STAGE FAN AIR SEAL - INSTALLATION.

(See figure 1A and Figures 8 and 8A.)

- a. Install 1st stage compressor stator assembly(3, figure 8) as follows:

NOTE

Fan case may be heated using PWA 57825 or PWA 57805 heater.

- (1) If installing PWA 57825 heater, use following steps: (See figure 1A.)
 - (a) Remove ball lock pins(1, figure 1A) and set clamp assemblies(10) to fourth highest position on risers(11) and install ball lock pins(1). Make sure risers(11) are installed in socket position farthest from clamp.

- (b) Set toggle clamps(9) to full open position.
- (c) Loosen handknobs(2) on centering blocks(3) on top of heater and position each block so that number 4 aligns with mark on heater top plate.
- (d) Tighten handknobs(2) on centering blocks(3).
- (e) Loosen handknob(6) on thermocouple block(7) and pull back to full retracted position.
- (f) Position PWA 57825 heater in fan case by locating clamp assemblies(10) on forward flange of fan case and closing toggle clamps(9) on flange in order to lock.
- (g) Loosen handknobs(2) of centering blocks(3) slightly to allow for hand adjustment of blocks to full 3 point engagement of blocks in case. Tighten handknobs(2).
- (h) Adjust thermocouple block(7) to contact fan case with tip of thermocouple(8). Tighten handknob(6).
- (i) Connect thermocouple cable of PWA 61685 heater controller to thermocouple(8) probe of heater.
- (j) Connect power cable(4) to PWA 61685 heater controller and turn controller power On.

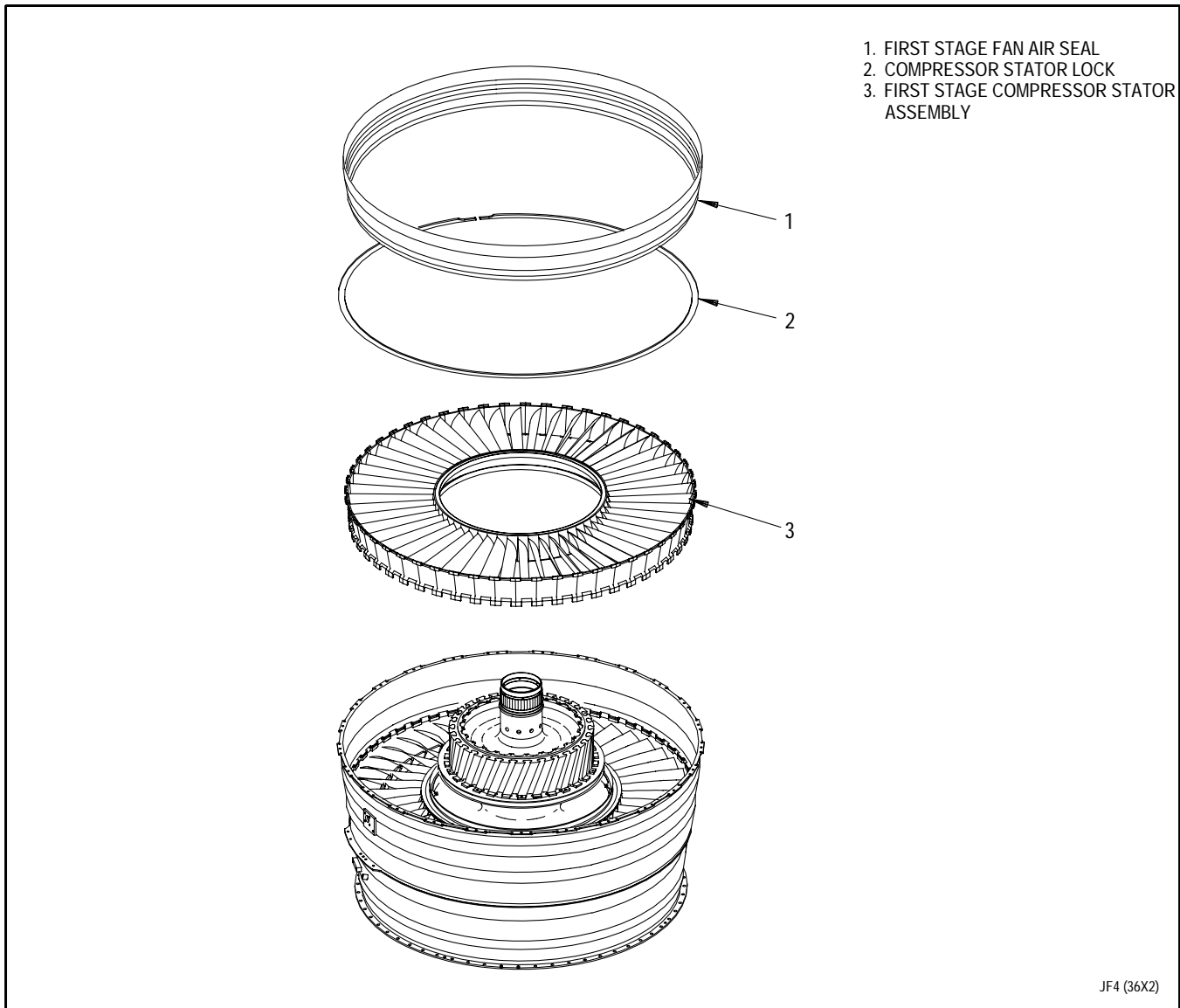


Figure 8. First Stage Compressor Stator Assembly and First Stage Fan Air Seal - Installation

CAUTION

Exceeding maximum specified temperature will damage fan case.

- (k) Set heater controller to heat fan case from 225° to 275°F (107° to 135°C).

- (l) Allow fan case to reach temperature between 225° and 275°F then maintain temperature for 5 minutes. Do not exceed 425°F (218°C).
- (m) After maintaining temperature for 5 minutes, turn heater controller power Off and set controller set point to 0°F.

- (n) Open toggle clamps(9) to release heater from fan case flange and remove heater from case.



Failure to use caution when setting heater down may result in damage to heating elements.

- (o) Place heater on stand assembly(12) to prevent damage to flooring.
- (2) If installing PWA 57805 heater use the following steps:
 - (a) Disengage detail-8 ball lock pin and slide detail-11 handle on detail-17 arm to free linkage.
 - (b) Install heater into fan case with temperature control box facing up.
 - (c) Install heater band into area of case to be heated and expand band to approximate fit.
 - (d) Lock band into position by inserting detail-8 ball lock pin through detail-3 arm and detail-2-2 locator.
 - (e) Slide detail-11 slide handle over detail-17 arm and snug heater band to case by turning detail-30 turnbuckle nut.
 - (f) Attach grounding strap to fan case.



Exceeding maximum specified temperature will damage fan case.

- (g) Set temperature control to 350°F (177°C). Heat 1st stage stator assembly mating area of outer fan case to 225°F (107°C) to 275°F (135°C). Do not exceed 425°F (218°C).
- (h) Remove heater by sliding detail-11 handle on detail-17 arm exposing connecting link.
- (i) Pull handle toward center of heater and remove heater from fan case.
- (3) Apply VV-P-236 petrolatum on rubber seal inner surface of 1st stage compressor stator assembly.
- (4) Install 1st stage compressor stator assembly(3, figure 8) into outer fan case.
- (5) Tap stator with fiber drift and mallet to seat.
- (6) Install compressor stator lock(2) ensuring gap is between stator case slots.
- b. Install 1st stage fan air seal(1) as follows:

NOTE

Fan case may be heated using PWA 57825 or PWA 57805 heater.

- (1) If installing PWA 57825 heater, refer to figure 1A and use following steps:

- (a) Remove ball lock pins(1, figure 1A) and set clamp assemblies(10) to next to lowest position on risers(11) and install ball lock pins(1). Make sure risers(11) are installed in socket position farthest from clamp.
- (b) Set toggle clamps(9) to full open position.
- (c) Loosen handknobs(2) on centering blocks(3) on top of heater and position each block so that number 5 aligns with mark on heater top plate.
- (d) Tighten handknobs(2) on centering blocks(3).
- (e) Loosen handknob(6) on thermocouple block(7) and pull back to full retracted position.
- (f) Position PWA 57825 heater in fan case by locating clamp assemblies(10) on forward flange of fan case and closing toggle clamps(9) on flange in order to lock.
- (g) Loosen handknobs(2) of centering blocks(3) slightly to allow for hand adjustment of blocks to full 3 point engagement of blocks in case. Tighten handknobs(2).
- (h) Adjust thermocouple block(7) to contact fan case with tip of thermocouple(8). Tighten handknob(6).

- (i) Connect thermocouple cable of PWA 61685 heater controller to thermocouple(8) probe of heater.

- (j) Connect power cable(4) to PWA 61685 heater controller and turn controller power On.



Exceeding maximum specified temperature will damage fan case.

- (k) Set heater controller to heat fan case from 225° to 275°F (107° to 135°C). Do not exceed 425°F (218°C). Additionally, use PWA 51932 heater to heat 1st stage vane OD feet area. Fan case anti-rotation lugs shall be 225°F (107°C) minimum prior to heater removal. Verify temperature using pyrometer.
- (l) Allow fan case to reach temperature between 225° and 275°F then maintain temperature for 5 minutes.
- (m) After maintaining temperature for 5 minutes, turn heater controller power Off and set controller set point to 0°F.
- (n) Open toggle clamps(9) to release heater from fan case flange and remove heater from case.



Failure to use caution when setting heater down may result in damage to heating elements.

- (o) Place heater on stand assembly(12) to prevent damage to flooring.
- (2) If installing PWA 57805 heater use the following steps:
 - (a) Disengage detail-8 ball lock pin and slide detail-11 handle on detail-17 arm to free linkage.
 - (b) Install heater into fan case with temperature control box facing up.
 - (c) Install heater band into area of case to be heated and expand band to approximate fit.
 - (d) Lock band into position by inserting detail-8 ball lock pin through detail-3 arm and detail-2-2 locator.
 - (e) Slide detail-11 slide handle over detail-17 arm and snug heater band to case by turning detail-30 turnbuckle nut.
 - (f) Attach grounding strap to fan case.



Exceeding maximum specified temperature will damage fan case.

- (g) Set temperature control to 350°F (177°C). Heat 1st stage fan air seal mating area of outer fan case to 225°F (107°C) to 275°F (135°C). Do not exceed 425°F (218°C). Additionally, use PWA 51932 heater to heat 1st stage vane OD feet area. Fan case anti-rotation lugs shall be 225°F (107°C) minimum prior to heater removal. Verify temperature using pyrometer.
- (h) Remove heater by sliding detail-11 handle on detail-17 arm exposing connecting link. Keep heater removal and air seal installation time to a minimum to provide adequate fan case expansion for air seal installation.
- (i) Pull handle toward center of heater and remove heater from fan case.



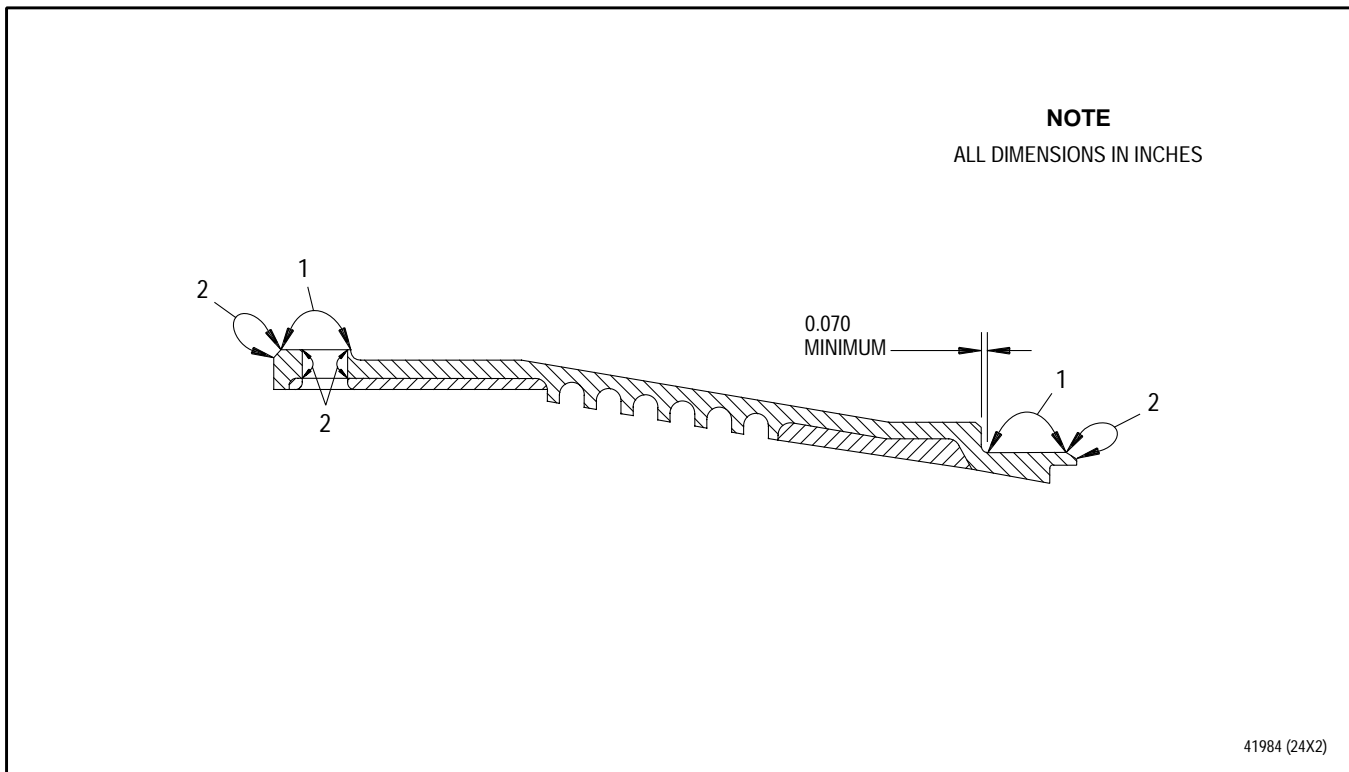
To prevent 1st stage fan airseal from cracking, be careful not to chip or dent airseal during installation.

NOTE

New air seal does not require application of PWA 36545 antigalling compound.

- (3) Apply PWA 36545 antigalling compound to 1st stage fan air seal(1, figure 8) snap diameters per figure 8A. Refer to T.O. 2J-F100-53-1, SWP 098 07.

- (4) Align dye mark on 1st stage fan air seal (flat area) with dye mark on fan case at oil tank mount bracket location. If new air seal (without a dye mark) is installed, align scallop on OD of air seal with two threaded oil tank mount bracket holes in fan case. Holes are located approximately 2.125 inches from forward flange, 105 degrees from Top Dead Center (aft looking forward).
- (5) Install 1st stage fan air seal. Tap seal with fiber drift and mallet to seat.



1. Apply antigalling compound per text.
2. Antigalling compound optional and may be incomplete.

Figure 8A. First Stage Fan Air Seal (PN 4081566) - Antigalling Compound Application

8. FIRST STAGE COMPRESSOR ROTOR BLADES AND FRONT COMPRESSOR INLET AIR SEAL - INSTALLATION.

(See figure 5, and Figure 9.)

NOTE

- The 1st stage compressor rotor blades may be transferred only from a module with greater total low cycle fatigue (LCF) cycles remaining to the next schedule depot visit to a module with less total low cycle fatigue cycles remaining to the next schedule depot visit.
- Blades are moment-weighted and are replaced in sets. A blade set consists of two blades within 0.200 ounce-inch of same moment-weight. If any blade is replaced, ensure that matched blade, 180 degrees away, is also replaced.

- a. Install 1st stage compressor rotor blades(4, figure 9) as follows:

NOTE

For installation of a complete set of blades, refer to step b.

- (1) Match numbers marked on blades with numbers on disk, then install blades part way into disk in a counterclockwise direction, with leading (longer) edges of blades facing toward front of disk. Ensure that blades are installed in disk with correct orientation.

- (2) Seat blades using a rubber mallet.

- b. Install a complete set of 1st stage compressor rotor blades(4, figure 9) as follows:

- (1) Select moment-weighted blades per WP 604 00.
- (2) Lay out blades in order of assembly to facilitate assembly.
- (3) Install blades partially into disk in a counterclockwise direction with leading (longer) edges of blades facing toward front of disk. Ensure seals are inside of blade flanges. Number 1 blade to be installed 120° from number 1 blade in 2nd stage in a counterclockwise direction.
- (4) Seat blades using a rubber mallet.

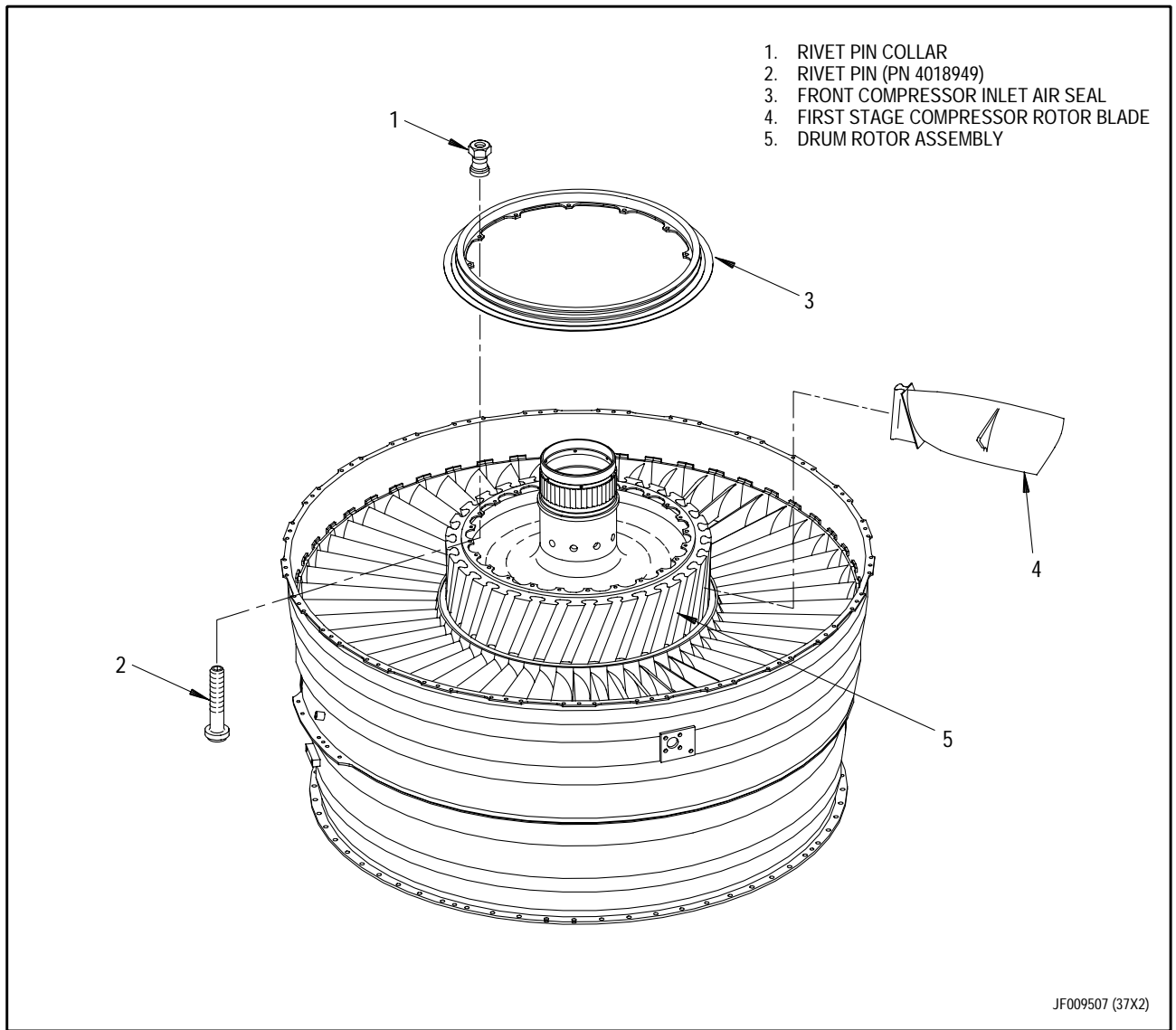


Figure 9. First Stage Compressor Rotor Blades and Front Compressor Inlet Air Seal - Installation

- c. Secure blades by installing front compressor inlet air seal(3) as follows:
 - (1) Remove protector and heat front compressor inlet air seal(3) in oven to 200°F (93°C) for a minimum of 10 minutes.
 - (2) Install heated front compressor inlet air seal onto front of 1st stage disk area of drum rotor assembly(5), aligning rivet holes and dye mark made at disassembly.
 - (3) Seat air seal using phenolic drift and mallet.
 - (4) Install rivet pins(2) and rivet pin collars(1) with rivet pin heads against disk.

NOTE

Wrenching flat of collar will shear off when proper torque is reached.

- (5) Using opposite pattern torque collars using HLA 1051 air driver or hexagon wrench and open end wrench. (See figure 5.)
 - (6) Check for proper installation by using finger pressure to try to rotate pin and collar. If pin and collar rotate, they are improperly installed and must be replaced.
- d. Balance front compressor rotor and stator assembly per WP 706 00.
 - e. Install protective cover over inlet/fan module if engine assembly is interrupted.

9. FOLLOW-ON MAINTENANCE.

- a. Install fan inlet case assembly per WP 702 00.

WORK PACKAGE**TECHNICAL PROCEDURES****INLET/FAN MODULE (FRONT SECTION) -****ASSEMBLY****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 34

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	24	6B Blank Added	16	10	17
2	17	7	15	11 - 15	0
3	24	8 - 8F	20	16 - 16A	24
4 - 5	20	8G Added	20	16B Added	23
6	23	8H Blank Added	20	17 - 21	24
6A	24	9	6	22	0

REFERENCE MATERIAL REQUIRED

Title	Number
Inlet/Fan Module - - - - -	T.O. 2J-F100-53-6
Blade, Compressor Rotor, First Stage through Blade, Compressor Rotor, Third Stage - Installation - - - - -	WP 701 00
Standard Maintenance Procedures - - - - -	T.O. 2-1-111
Wrench, Hydraulic, PWA 50308 - - - - -	T.O. 32B14-5-2-1

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

T.O. No.	Date	Level	Title (ECP No.)
T.O. 2J-F100229-546	30 Sep 95	O/I, D	Modification of Retainer Ball Lock Pin Handle PWA 57614, F100-PW-229 Engine, F-15/F-16 Aircraft (ECP 93QC038)

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Acetone(PMC 9008)orAlcohol, isopropyl(PMC 9094)	O-A-51 TT-I-735
Compound, antigalling (PWA 550)	Hi-T-650 or Lubri-Bond HT
Compound, antigalling (PWA 36545)	EsnaLube 382
Lockwire (0.032 inch diameter)	MS9226-04
Oil, lubricating	MIL-L-7808

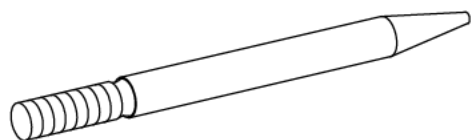
EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

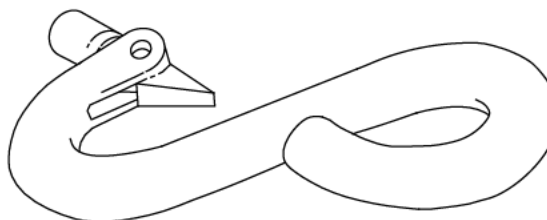
Paragraph	Function - Tool Nomenclature	Tool Number
3	FAN INLET CASE ASSEMBLY - INSTALLATION	
	RETAINER, INLET/FAN MODULE, FRONT HANDLING - - - - -	PWA 57803
		OR
	RETAINER, INLET, FAN MODULE HANDLING, FRONT - - - - -	PWA 57614
	SLING, HANDLING - - - - -	PWA 56336
	HOOK, SAFETY - - - - -	PWA 2388
	ADAPTER, TRUNNION (TWO REQUIRED) - - - - -	PWA 26147
	PIN, ALIGNMENT - - - - -	LM 1020
	HEATER, FAN CASE, SHROUD INSTALLATION, VARIOUS - - -	PWA 57825
		OR
	HEATER, FAN CASE, SHROUD INSTALLATION - - - - -	PWA 57805
	CONTROL, HEATER - - - - -	PWA 61685
		OR
	CONTROL, HEATER - - - - -	PWA 25672
3A	FAN INLET CASE ASSEMBLY - INSTALLATION	
	HEATER-FAN INLET CASE/NO. 2 BRG SUPPORT INNER FLANGE - - - - -	PWA 56323
		OR
	HEATER - - - - -	PWA 52859
	HEATER, CONTROL - - - - -	PWA 61685
4	No. 1 BEARING AND No. 1 BEARING SEAL SEAT - INSTALLATION	
	RETAINER-NO. 1 BEARING INNER RACE ROLLERS - - - - -	PWA 51791
	PUSHER, NO. 1 BEARING AND SEAL SEAT - - - - -	PWA 53889
	PUMP, HYDRAULIC HAND - - - - -	PWA 55380
	STAND, INLET/FAN MODULE, STORAGE AND DISASSEMBLY - -	PWA 56338
	ADAPTER SET, HYDRAULIC WRENCH TO WRENCH - - - - -	PWA 57806
		OR
	ADAPTER SET, HYDRAULIC WRENCH TO WRENCH - - - - -	PWA 57649
	ADAPTER, NO. 1 BEARING HOUSING HEATER - - - - -	PWA 57732
	ADAPTER, TORQUE, REMOVE AND INSTALL, VARIOUS NUTS -	PWA 57906
		OR
	ADAPTER SET, REMOVE/INSTALL VARIOUS RETAINING NUTS -	PWA 57807
		OR
	ADAPTER SET, REMOVE/INSTALL VARIOUS RETAINING NUTS -	PWA 57650
	WRENCH, HYDRAULIC - - - - -	PWA 50308
	RETAINER, INLET/FAN MODULE REAR HANDLING - - - - -	PWA 57615

ILLUSTRATED SUPPORT EQUIPMENT



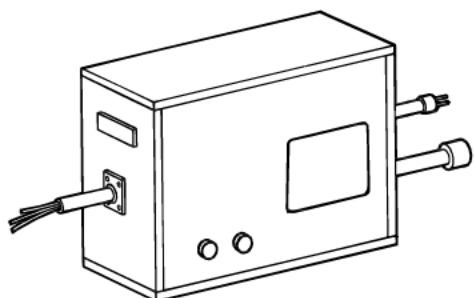
LM1020

Figure T1. LM 1020 PIN



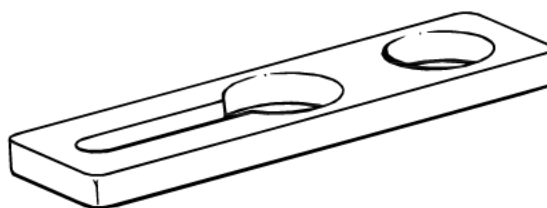
PWA 2388 -C

Figure T2. PWA 2388 HOOK



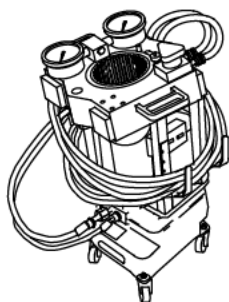
PWA 25672 -C

Figure T3. PWA 25672 CONTROL



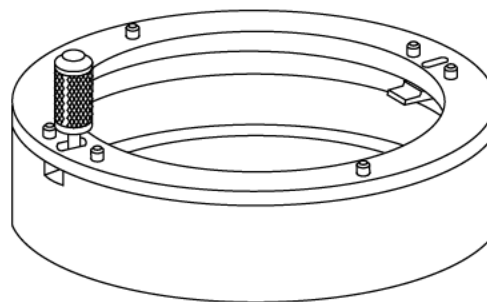
PWA 26147 -C

Figure T4. PWA 26147 ADAPTER



PWA 50308 -C

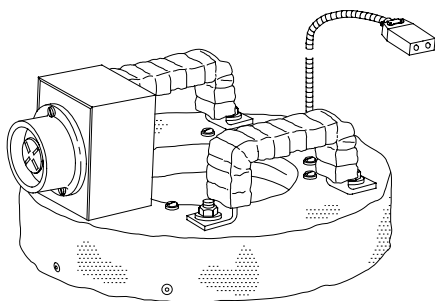
Figure T5. PWA 50308 WRENCH



PWA 51791 -C

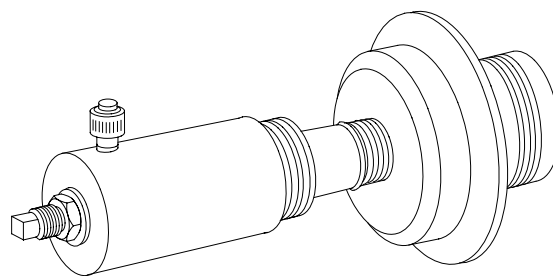
Figure T6. PWA 51791 RETAINER

ILLUSTRATED SUPPORT EQUIPMENT (continued)



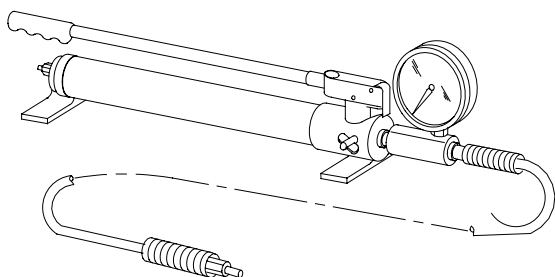
PWA 52859 -C

Figure T7. PWA 52859 HEATER



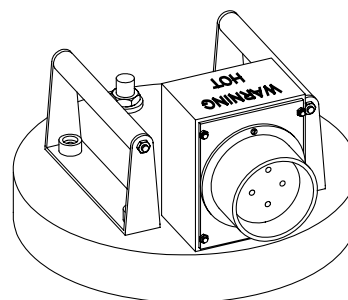
PWA 53889 -C

Figure T8. PWA 53889 PUSHER



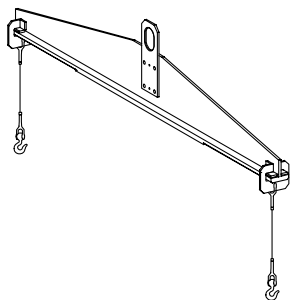
PWA 55380 -C

Figure T9. PWA 55380 PUMP



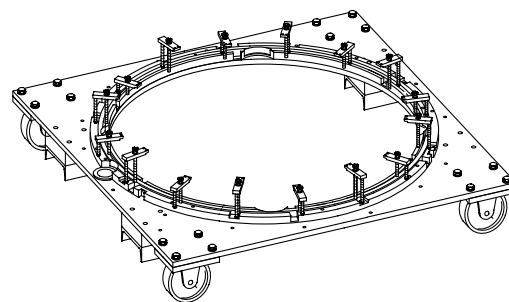
PWA 56323 -C

Figure T10. PWA 56323 HEATER



PWA 56336 -C

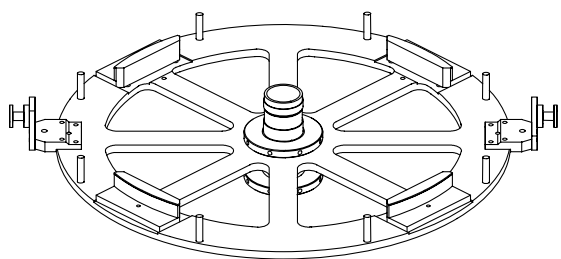
Figure T11. PWA 56336 SLING



PWA 56338 -C

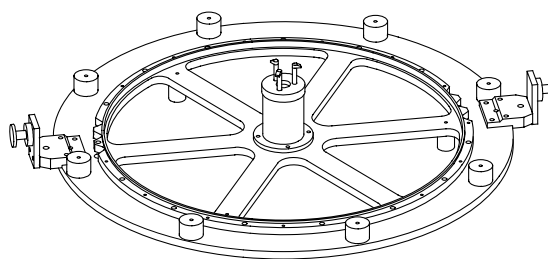
Figure T12. PWA 56338 STAND

ILLUSTRATED SUPPORT EQUIPMENT (continued)



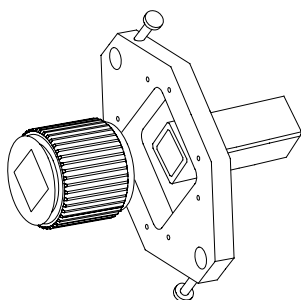
PWA 57614 -C

Figure T13. PWA 57614 RETAINER



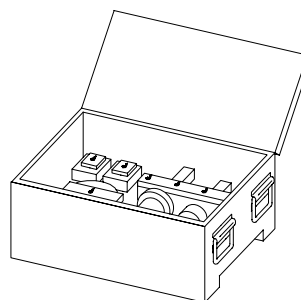
PWA 57615 -C

Figure T14. PWA 57615 RETAINER



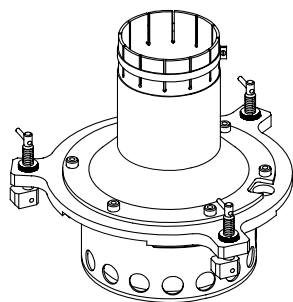
PWA 57649 -C

Figure T15. PWA 57649 ADAPTER SET



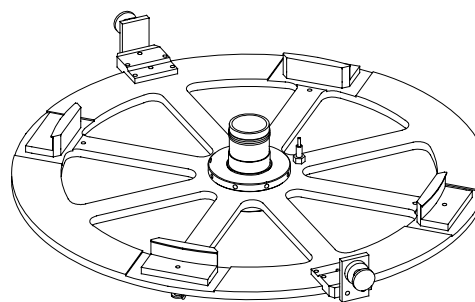
PWA 57650 -C

Figure T16. PWA 57650 ADAPTER SET



PWA 57732 -C

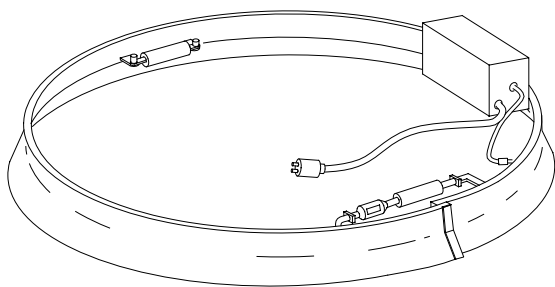
Figure T17. PWA 57732 ADAPTER



PWA 57803 -C

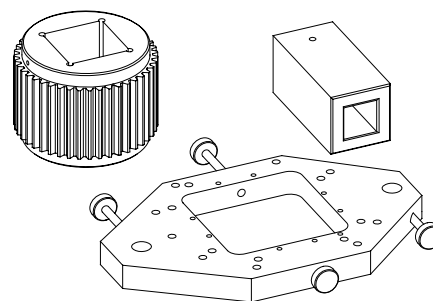
Figure T18. PWA 57803 RETAINER

ILLUSTRATED SUPPORT EQUIPMENT (continued)



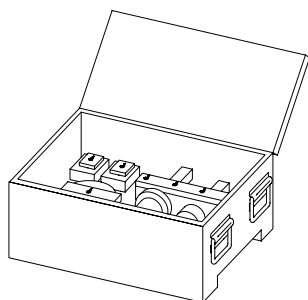
PWA 57805 -C

Figure T19. PWA 57805 HEATER



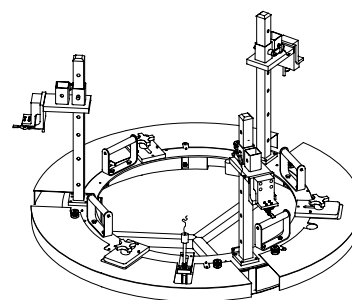
PWA 57806 -C

Figure T20. PWA 57806 ADAPTER SET



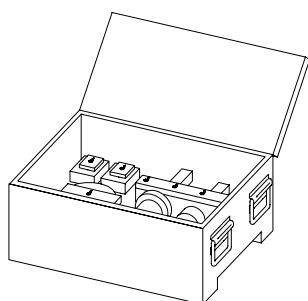
PWA 57807 -C

Figure T21. PWA 57807 ADAPTER SET



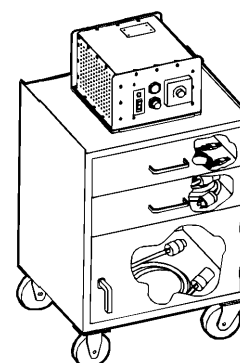
PWA 57825 -C

Figure T22. PWA 57825 HEATER



PWA 57906 -C

Figure T23. PWA 57906 ADAPTER



PWA 61685 -C

Figure T24. PWA 61685 CONTROL

1. INTRODUCTION.

- a. This work package consists of instructions for installation of fan inlet case through No. 1 bearing assembly.

2. PRELIMINARY INSTRUCTIONS.

- a. Install third stage compressor rotor blades through first stage compressor rotor blades per WP 701 00.

3. FAN INLET CASE ASSEMBLY - INSTALLATION.

(See Figures 1, 1A, 1B, and 2.)

NOTE

- This procedure applies to engines not incorporating lockwire on No. 1 bearing housing bolt heads where case was removed with No. 1 bearing housing installed on case.
 - For engines incorporating lockwire on No. 1 bearing housing bolt heads, where No. 1 bearing housing remained on fan module after inlet case removal, case is installed per paragraph 3A.
 - Use of PWA 50993 spacer to elevate the fan inlet case assembly is optional and may be utilized for ease of maintenance.
- a. Position fan inlet case to front end up position on a workbench.

NOTE

- PWA 57803 retainer contains PWA 57614 details.
 - Shaft and nut details of PWA 57614 front retainer are not used in fan inlet case installation procedure
- b. Attach PWA 57803 front retainer to fan inlet case as follows:
 - (1) Loosen detail bolts and position slide jaw details inward to prevent interference with fan inlet case.
 - (2) Using overhead hoist, PWA 56336 sling, PWA 2388 hook, and PWA 26147 adapters, lower base detail. Align guide pin of base detail with locator hole on fan inlet case inner flange per figure 1.
 - (3) Move slide jaw details outward until they engage slot in fan inlet case. Secure using ball lock pin. Tighten eight detail-20 bolts.
 - c. Remove front compressor inlet air seal protector, if present.

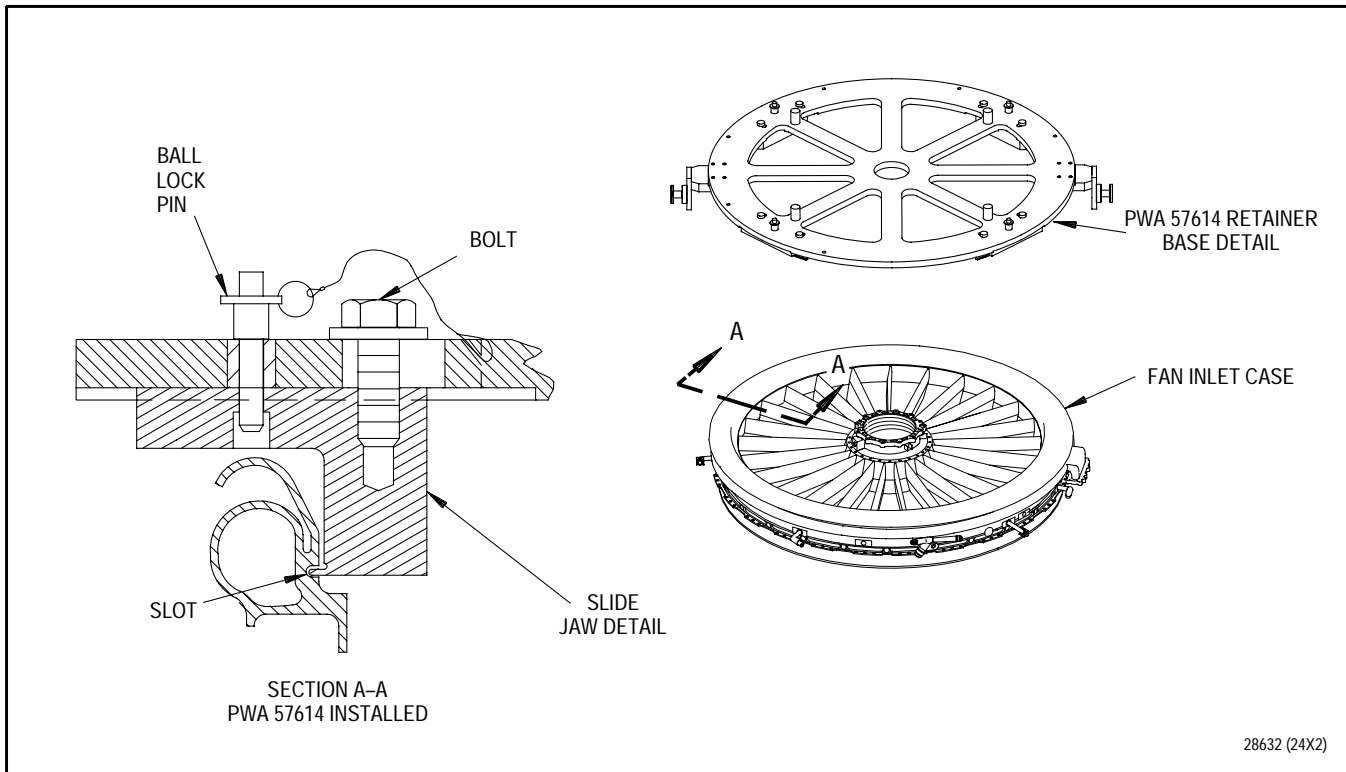


Figure 1. Fan Inlet Case Assembly - PWA 57803 Front Retainer Installation

NOTE

There are two inlet case configurations. One with DC 3120 RTV rubber in fairing pocket, the other one without. Cases with rubber require performance of step d.

- d. Prepare for installation of inlet case with rubber in fairing pocket as follows:
 - (1) Clean forward ID surface of fan case with isopropyl alcohol or acetone.
 - (2) Apply PWA 36545 Esnalube 382 antigalling compound on front inner surface of fan case.
 - (3) Apply a thin coating of lubricating oil on inlet case rubber.
 - (4) Deleted.

- e. Install LM 1020 alignment pins at 3 and 9 o'clock positions on fan inlet case Flange B. (See Figure 1A.)

NOTE

Fan case may be heated using PWA 57825 or PWA 57805 heater.

- f. If installing PWA 57825 heater, use following steps: (See figure 1B.)
 - (1) Remove ball lock pins(1, figure 1B) and set clamp assemblies(12) to lowest position on risers(13) and install ball lock pins(1). Make sure risers(13) are installed in socket position farthest from clamp.
 - (2) Set toggle clamps(7) to full open position.

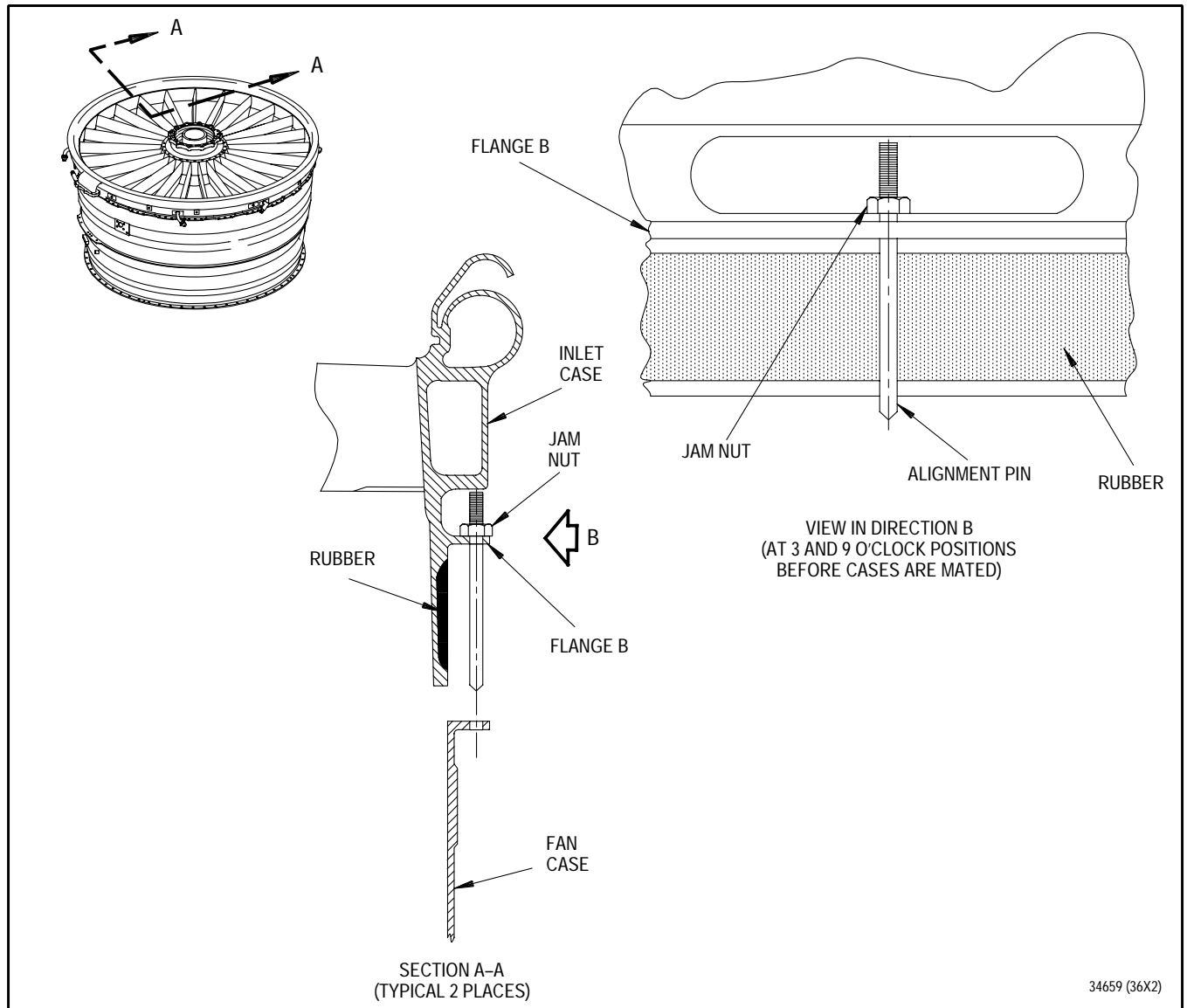
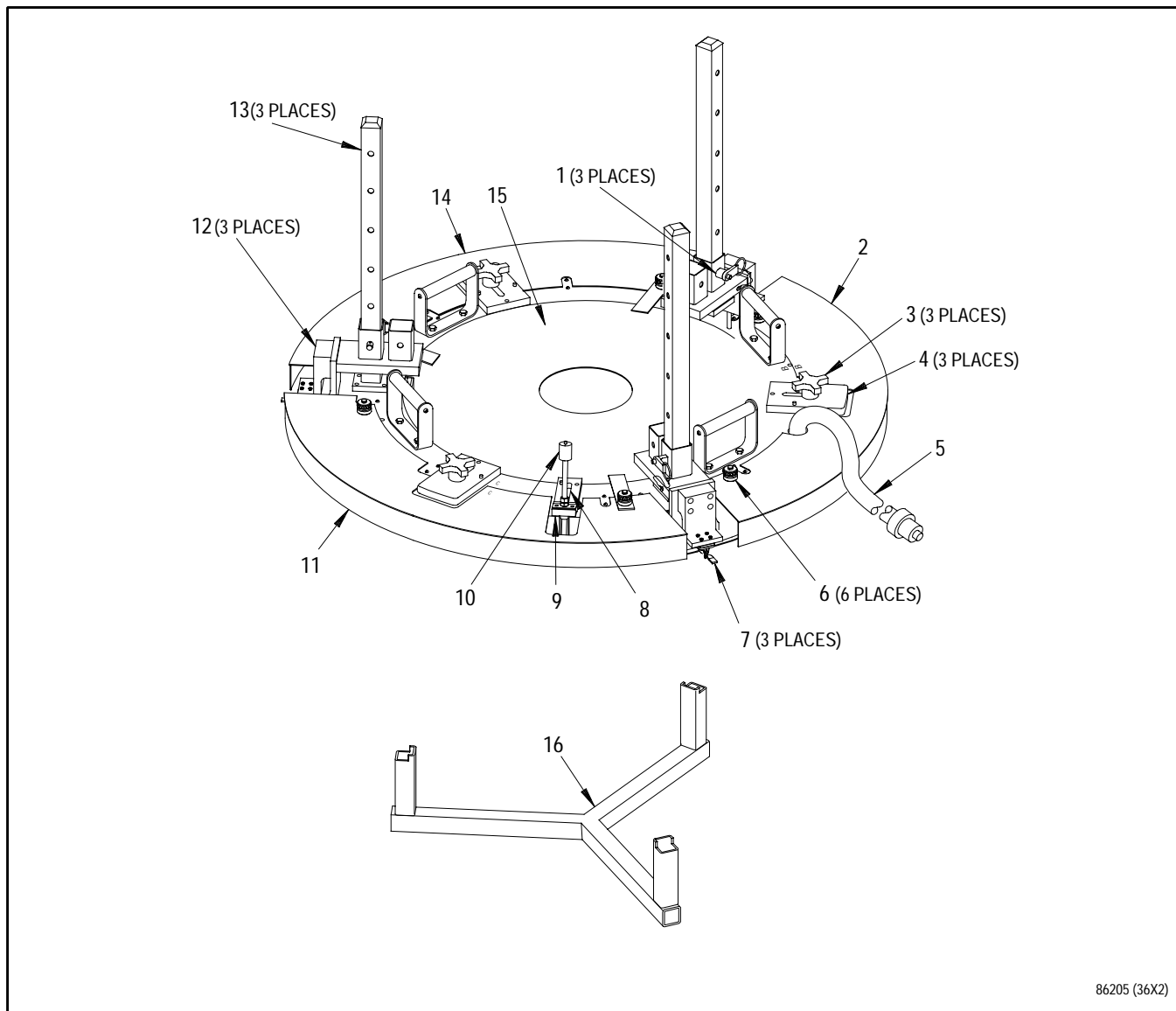


Figure 1A. Fan Inlet Case Assembly - Alignment Pin Installation

- (3) Loosen handknobs(3) on centering blocks(4) on top of heater and position each block so that number 7 aligns with mark on heater top plate.
- (4) Tighten handknobs(3) on centering blocks(4).
- (5) Loosen handknob(8) on thermocouple block(9) and pull back to full retracted position.
- (6) Position PWA 57825 heater in fan case by locating clamp assemblies(12) on forward flange of fan case and closing toggle clamps(7) on flange in order to lock.
- (7) Loosen handknobs(3) of centering blocks(4) slightly to allow for hand adjustment of blocks to full 3 point engagement of blocks in case. Tighten handknobs(3).



- | | |
|--------------------|------------------------|
| 1. Ball Lock Pin | 9. Thermocouple Block |
| 2. Heatshield "B" | 10. Thermocouple |
| 3. Handknob | 11. Heatshield "C" |
| 4. Centering Block | 12. Clamp Assembly |
| 5. Power Cable | 13. Riser |
| 6. Knurled Knob | 14. Heatshield "A" |
| 7. Toggle Clamp | 15. Heatshield (Inner) |
| 8. Handknob | 16. Stand Assembly |

Figure 1B. PWA 57825 Heater - Installation with Heatshields

- (8) Install yellow heatshields (2,11,14,15) by removing knurled knobs(6) and matching heat shields with markings on heater top plate. Install heat shield(15) last and then replace all knurled knobs(6).
- (9) Adjust thermocouple block(9) to contact fan case with tip of thermocouple(10). Tighten handknob(8).
- (10) Connect thermocouple cable of PWA 61685 heater controller to thermocouple(10) probe of heater.
- (11) Connect power cable(5) to PWA 61685 heater controller and turn controller power On.



Exceeding maximum specified temperature will damage fan case.

- (12) For inlet cases with rubber, set heater controller to heat fan case from 350° to 400°F (177° to 204°C). For inlet cases without rubber, set heater controller to heat fan case from 250° to 275°F (121° to 135°C)
- (13) Allow fan case to reach temperature between 350° and 400°F for cases with rubber and between 250° and 275°F for cases without rubber, then maintain temperature for 5 minutes. Do not exceed 425°F (218°C).
- (14) After maintaining temperature for 5 minutes, turn heater controller power Off and set controller set point to 0°F.

NOTE

It is not necessary to remove heat shields in order to remove heater.

- (15) Open toggle clamps(7) to release heater from fan case flange and remove heater from case.



Failure to use caution when setting heater down may result in damage to heating elements.

- (16) Place heater on stand assembly(16) to prevent damage to flooring.
- g. If installing PWA 57805 heater, use the following steps:
- (1) Disengage detail-8 ball lock pin and slide detail-11 handle on detail-17 arm to free linkage.
 - (2) Install heater into fan case with temperature control box facing up.
 - (3) Install heater band into area of case to be heated and expand band to approximate fit.
 - (4) Lock band into position by inserting detail-8 ball lock pin through detail-32 arm and detail-31-2 locator
 - (5) Slide detail-11 slide handle over detail-17 arm and snug heater band to case by turning detail-30 turnbuckle nut.
 - (6) Attach grounding strap to fan case.



Exceeding maximum specified temperature will damage fan case.

- (7) If installing inlet case with rubber, heat inlet case mating area of outer fan case from 350° to 400°F (177° to 204°C). If installing inlet case without rubber, heat inlet case mating area of outer fan case from 250° to 275°F (121° to 135°C). Do not exceed 425°F (218°C).

- (8) Remove heater by sliding detail-11 handle on detail-17 arm exposing connecting link.

- (9) Pull handle toward center of heater and remove heater from fan case.

- h. Carefully lower fan inlet case onto fan case. Use alignment pin to align dowel pin on fan inlet case with dowel pin hole on fan case outer flange. Tap to seat. Remove alignment pins.
- i. Lubricate Flange B bolts with PWA 550 antigalling compound.
- j. Position EDU front mount brackets at marked locations on Flange B. Secure with bolts (bolt heads rearward) and nuts per figure 2.
- k. Install bolts, spacers (forward of flange), and nuts on Flange B to secure fan inlet case to fan case per figure 2. Torque all bolts 27 to 30 pound-inches. Lockwire bolts at location 40 and 42.
- l. Remove tooling and install protective coverings over No. 1 bearing area and inlet area.

Legend for figure 2

Bolthole	Bolt	Nut	Spacer	Lockwire	Lubricant	Torque
1-39	MS9556-10	4021812	4072296	-	PWA 550	27 to 30 lb-in.
40	MS9565-05	-	-	MS9226-04	PWA 550	27 to 30 lb-in.
41	-	-	-	-	-	-
42	MS9565-05	-	-	MS9226-04	PWA 550	27 to 30 lb-in.
43	MS9556-10	4021812	4072296	-	PWA 550	27 to 30 lb-in.
44,45	MS9556-10	4021812	-	-	PWA 550	27 to 30 lb-in.
46	MS9556-10	4021812	4072296	-	PWA 550	27 to 30 lb-in.
47,48	MS9556-10	4021812	-	-	PWA 550	27 to 30 lb-in.
49 - 75	MS9556-10	4021812	4072296	-	PWA 550	27 to 30 lb-in.

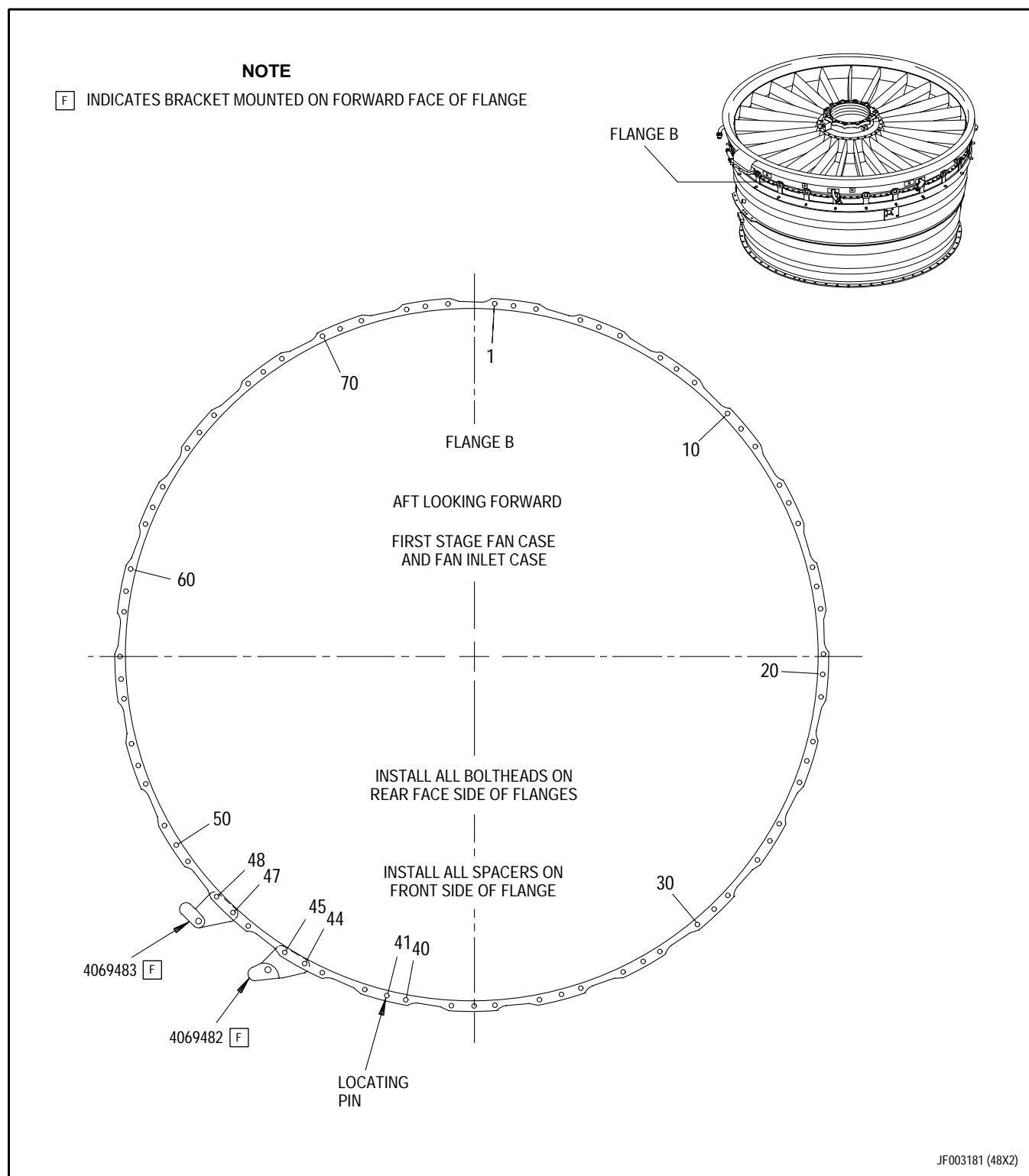


Figure 2. Flange B Bolts, Spacers, Nuts, and Brackets - Installation

3A. FAN INLET CASE ASSEMBLY - INSTALLATION

(See figure 2 and Figures 2A and 2B.)

NOTE

This procedure applies to engines incorporating lockwire on No. 1 bearing housing bolt heads, where No. 1 bearing housing remained on fan module after inlet case removal.

- a. Remove bolts(1, figure 2A) from Ps2 tube elbow(2), pressure tube elbow(6) and oil scavenge tube elbows(3,4 and 5) and position tubes outward.



Overheating fan inlet case may cause damage to parts.

- b. Position PWA 56323 or PWA 52859 heater on rear side of fan inlet case inner flange. Ensure heater thermocouple contacts surface being heated.
- c. Connect heater to PWA 61685 heater control. Set temperature at 250°F (121°C). Connect control to power source.
- d. Heat approximately 10 minutes.
- e. Remove heater and install case by aligning dowel pin of fan inlet case with dowel pin hole of No. 1 bearing housing.

Lightly tap case with nonmetallic mallet to seat.

- f. Install four evenly spaced workbolts to draw case to housing.
- g. Apply PWA 550 antigalling compound to threads of bolts used to secure case to No. 1 bearing housing.

NOTE

Three optional clamp(1, figure 2B) sizes are permitted to accommodate different positions and sizes of cable sheath. The proper clamp size will prevent cable movement and minimize cable overbraid pinching.

- h. Select optimum clamp(1) size to secure cables at three locations(4).

NOTE

Cable clamps and spacers(2) require longer bolts than remaining inlet case/No. 1 bearing housing mating flange bolts.

- i. Position three each clamps and spacers(2) on inlet case inner flange. Pull cables tight to remove slack inside inlet case vane and secure cables, clamps and spacers with bolts(3).

- j. Install remaining bolts to secure inlet case to No. 1 bearing housing assembly.
- k. Torque bolts 27 to 30 pound-inches and secure bolt heads with MS9226-03 lockwire.
- l. Position EDU front mount brackets at marked locations on Flange B. Secure with bolts (bolt heads rearward) and nuts per figure 2.
- m. Install bolts, spacers (forward of flange) and nuts on Flange B to secure case to fan case per figure 2.
- n. Torque all bolts 27 to 30 pound-inches. Lockwire bolts at location 40 and 42.
- o. Install protective coverings over No. 1 bearing area and inlet area.

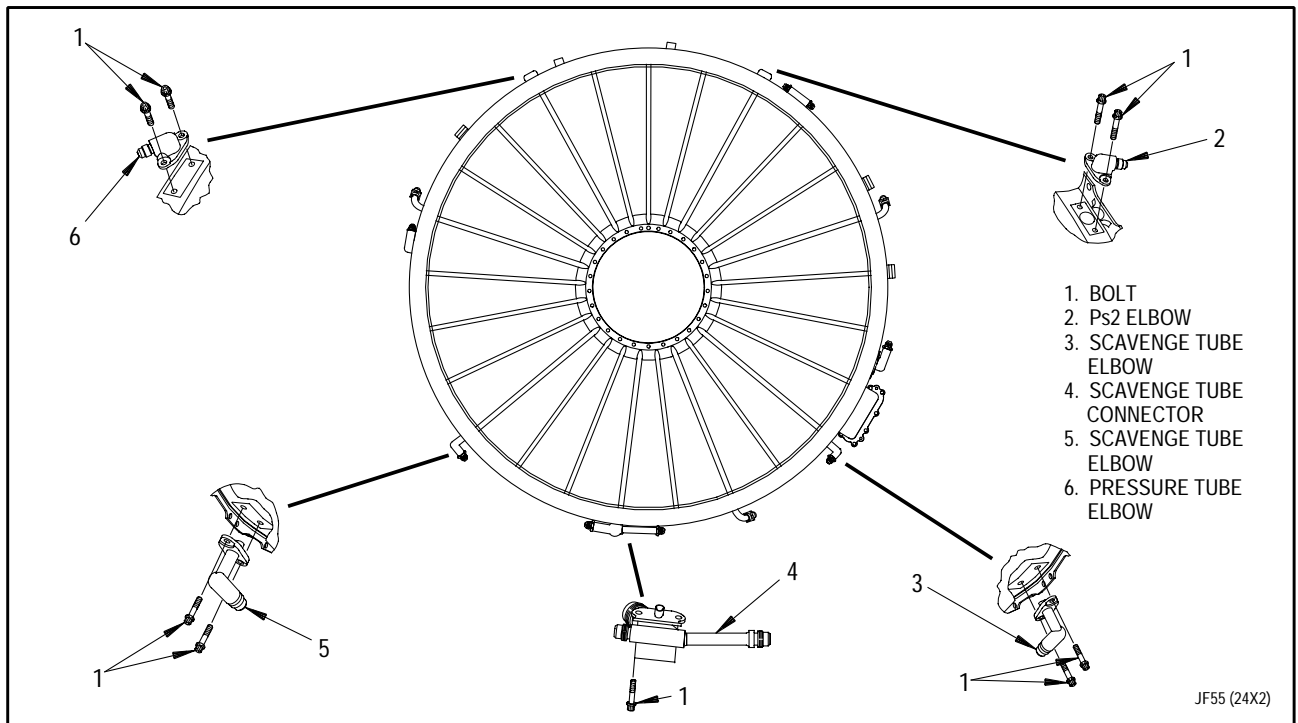


Figure 2A. Fan Inlet Case Assembly - Installation

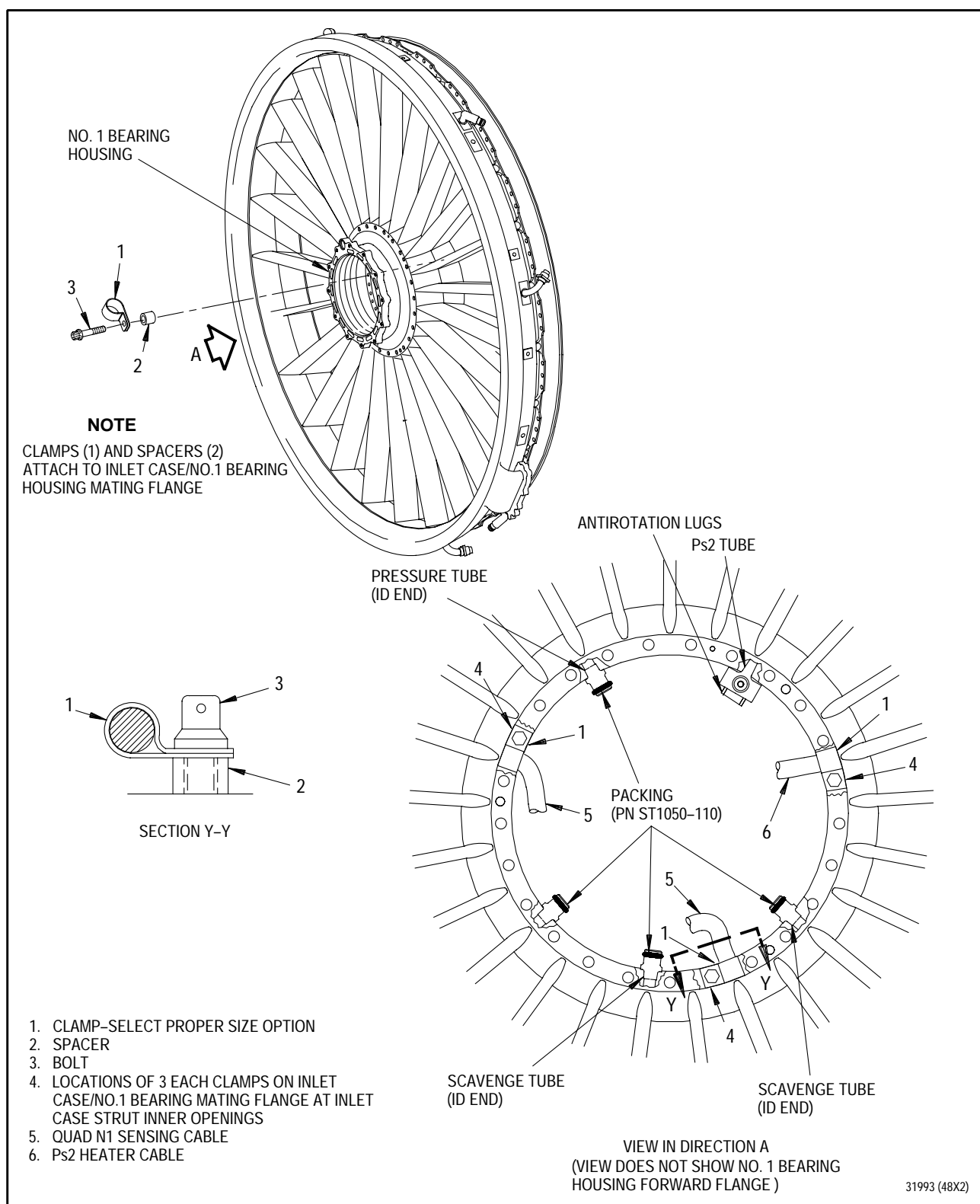


Figure 2B. Fan Inlet Case Assembly - Installation

4. No. 1 BEARING AND No. 1 BEARING SEAL SEAT - INSTALLATION.

(See Figures 3 through 8.)

NOTE

Use of PWA 50993 module support stand spacer to elevate fan inlet case assembly is optional and may be utilized for ease of maintenance.

- a. Remove protectors, if installed, and perform No. 1 bearing position measurement per figure 3.



Axial scratching of outer race will occur if bearing details (inner race, rollers, and outer race) are installed separately.

NOTE

- If outer race of bearing is removed for any reason, such as inspection, install PWA 51791 retainer on inner race and rollers to prevent rollers from possibly falling out of cage.
 - Additional instructions on bearing handling and installation are found in T.O. 2-1-111.
- b. Install No. 1 bearing assembly(3 and 4, figure 4) and seal seat(4) per figure 5. Ensure No. 1 bearing is installed as a unit.

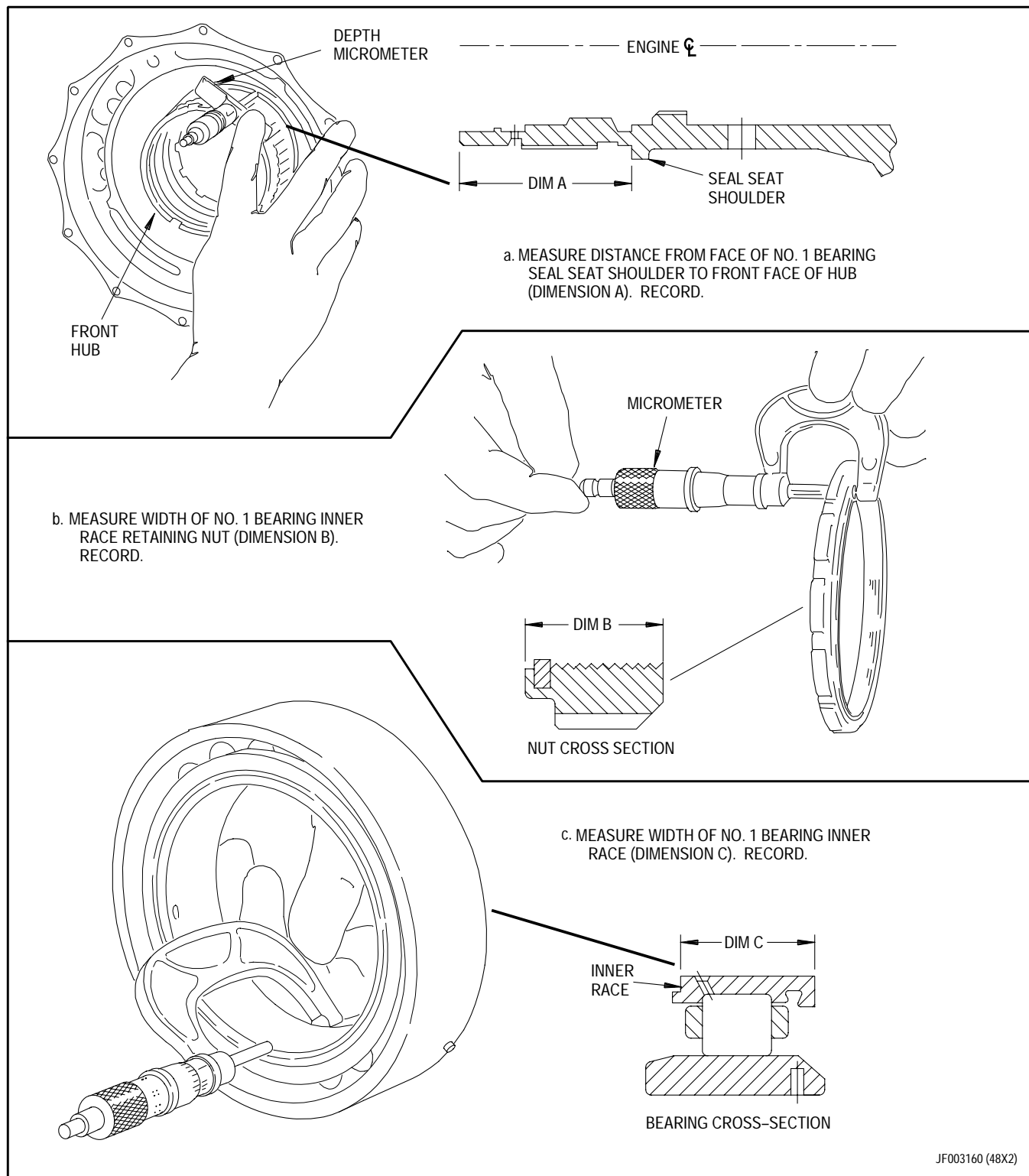


Figure 3. No. 1 Bearing Position Measurement Check - Summary of Operations (Sheet 1 of 2)

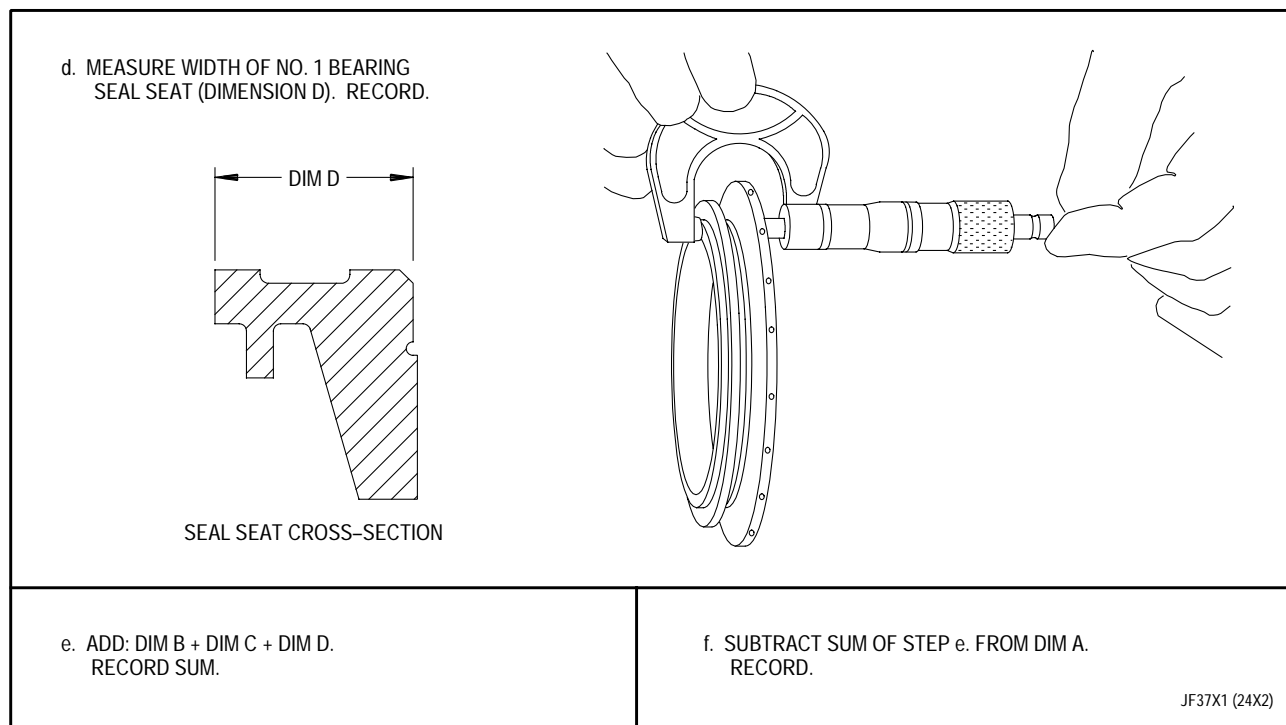


Figure 3. No. 1 Bearing Position Measurement Check - Summary of Operations (Sheet 2 of 2)

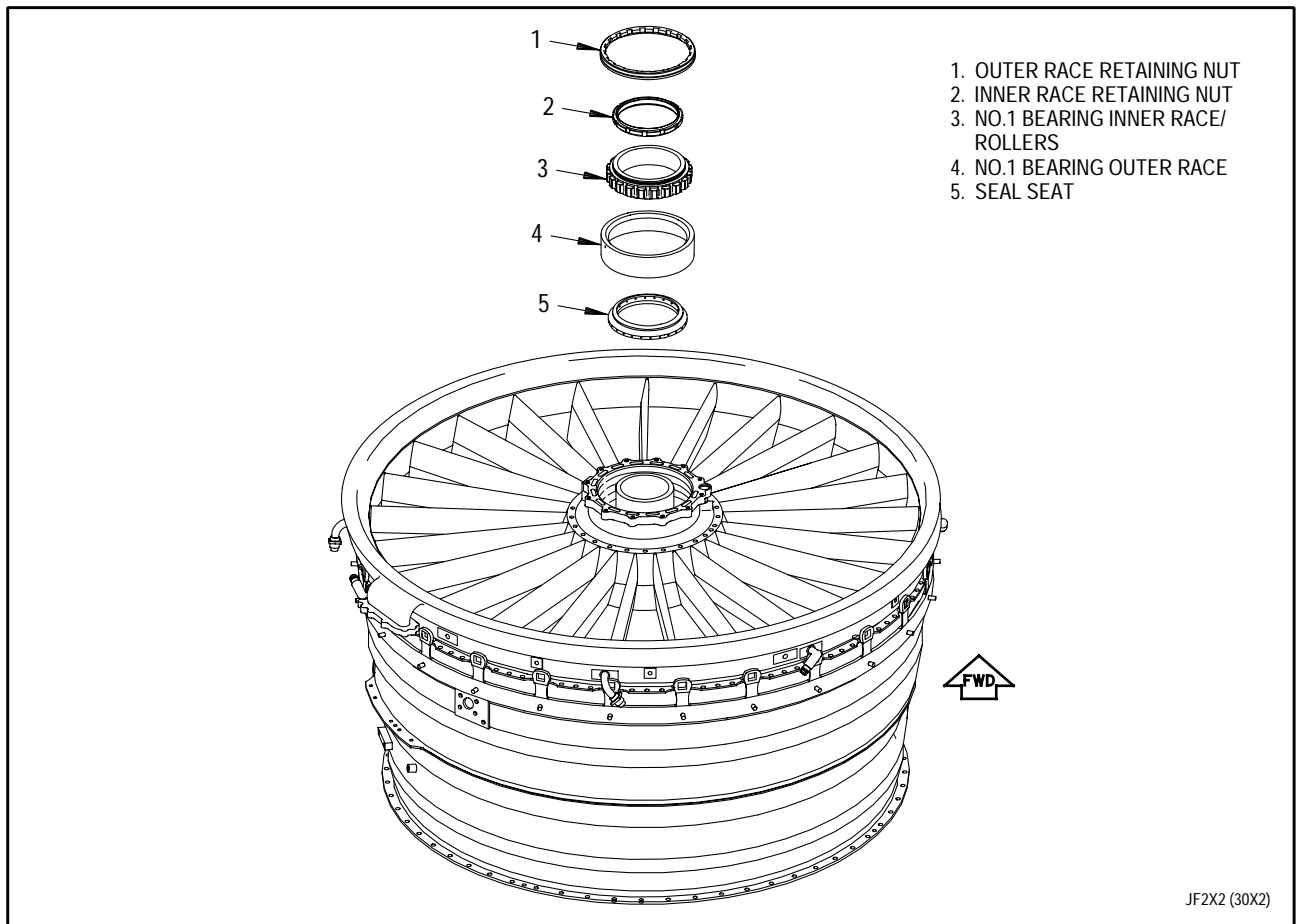


Figure 4. No. 1 Bearing and No. 1 Seal Seat - Installation

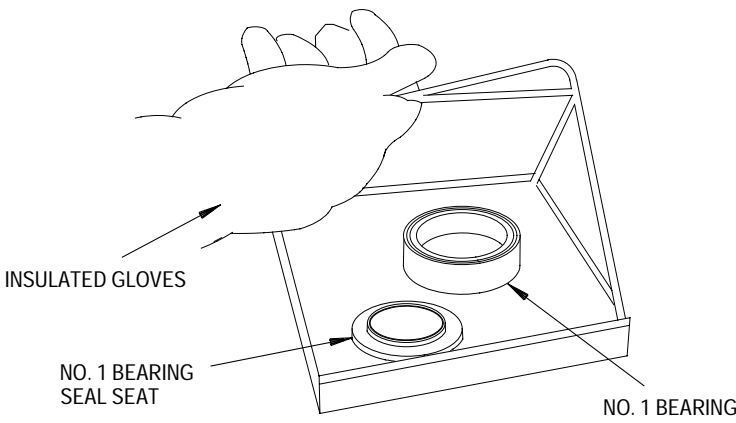
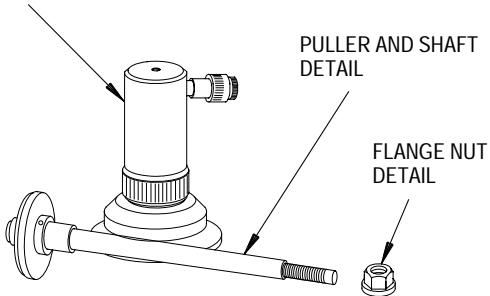
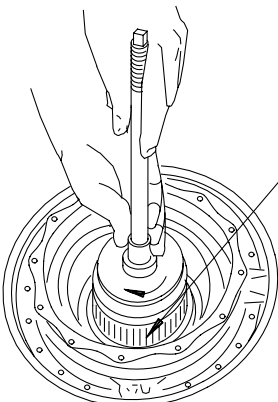
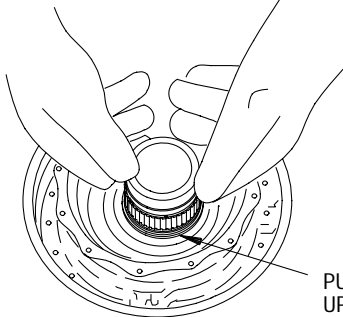
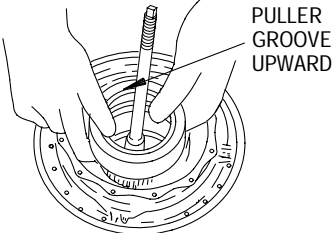
 <div style="position: absolute; top: 165px; left: 605px; border: 1px solid black; padding: 5px; text-align: center;">CAUTION</div> <p>FAILURE TO USE MIL-L-7808 ENGINE OIL ONLY CAN CAUSE BEARING SEAL SEAT DAMAGE.</p> <p>a. HEAT NO. 1 BEARING AND NO. 1 BEARING SEAL SEAT IN MIL-L-7808 ENGINE OIL AT 225 TO 275° F (107° TO 135° C) FOR ONE HOUR.</p>	
<p>HYDRAULIC CYLINDER AND PUSHER DETAIL</p>  <p>b. DISMANTLE PWA 53889 PUSHER INTO DETAIL PARTS.</p>	 <p>e. THREAD PULLER AND SHAFT DETAIL OF PUSHER INTO ID OF FRONT HUB UNTIL FIRST THREAD ON FRONT HUB SHOWS.</p>
 <p>c. INSTALL PWA 57732 HEATER ADAPTER ONTO SHAFT OF DRUM ROTOR. HEAT HOUSING APPROXIMATELY 250°F (121°C) FOR APPROXIMATELY 20 MINUTES.</p> <p>d. REMOVE HEATER AND INSTALL HEATED NO. 1 BEARING SEAL SEAT ON FRONT HUB, PULLER GROOVE UP.</p>	<div style="position: absolute; top: 555px; left: 605px; border: 1px solid black; padding: 5px; text-align: center;">CAUTION</div> <ul style="list-style-type: none"> • ANTIROTATION PINS IN OUTER RACE SHALL FACE UPWARD. INCORRECTLY INSTALLED PINS WILL RESULT IN DAMAGE TO BEARING. • PULLER GROOVE ON INNER RACE MUST FACE UPWARD. INCORRECTLY INSTALLED RACE CAN RESULT IN BEARING AND ENGINE DAMAGE. <p>f. INSTALL HEATED NO. 1 BEARING ON FRONT HUB WITH ANTIROTATION SIDE PINS AND INNER RACE PULLER GROOVE FACING UP. ALIGN ANTIROTATION PINS IN OUTER RACE WITH SLOTS IN NO. 1 BEARING HOUSING.</p>  <p>PULLER GROOVE UPWARD</p> <p>JF009541 (51X2)</p>

Figure 5. No. 1 Bearing Installation Using PWA 53889 Pusher (Sheet 1 of 2)

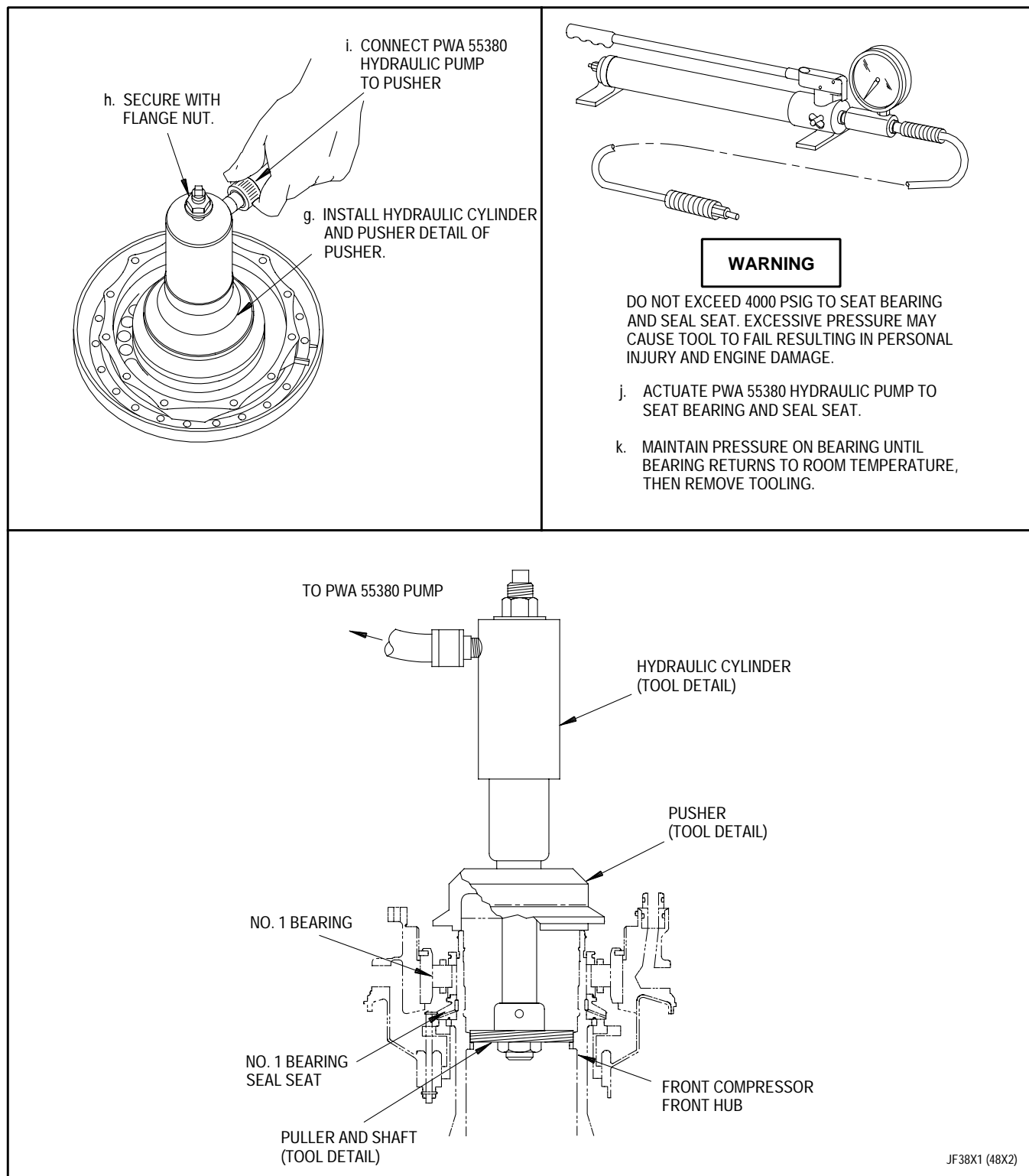


Figure 5. No. 1 Bearing Installation Using PWA 53889 Pusher (Sheet 2 of 2)

- c. Allow bearing to cool to room temperature, then install No. 1 bearing outer race retaining nut(1, figure 4) as follows:
- (1) Apply a light coat of MIL-L-7808 engine oil to nylon locking feature and threads of No. 1 bearing outer race retaining nut.
 - (2) Thread outer race retaining nut onto No. 1 bearing housing with nylon locking feature forward.
 - (3) Install PWA 57906 assembly C adapter into drum rotor and engage wrenching slots of No. 1 bearing outer race retaining nut. (See figures 5A and 5B for adapter set assembly identification.)
 - (4) Place PWA 57806 assembly M base assembly on bench with flat surface side down. Secure PWA 57906 assembly F sub base with side marked THIS SIDE OUT 229 ENGINE facing technician to base assembly using PWA 57906 assembly H cap screws.
 - (5) Install base assembly and sub base, as an assembly, to No. 1 bearing housing with side marked THIS SIDE OUT 229 ENGINE facing engine. Secure with PWA 57906 assembly H cap screws.
 - (6) Install PWA 57806 assembly L adapter assembly onto onto PWA 57906 assembly C adapter.
 - (7) Install PWA 57806 assembly K adapter assembly on PWA 57806 assembly L adapter assembly and secure with set screw. Engage and tighten PWA 57806 base assembly retaining screws fingertight.
 - (8) Using hoist and suitable nylon strap, install PWA 50308 hydraulic wrench onto PWA 57806 assembly M base assembly so drive pins of wrench engage holes in base assembly. Secure with thumbscrews.

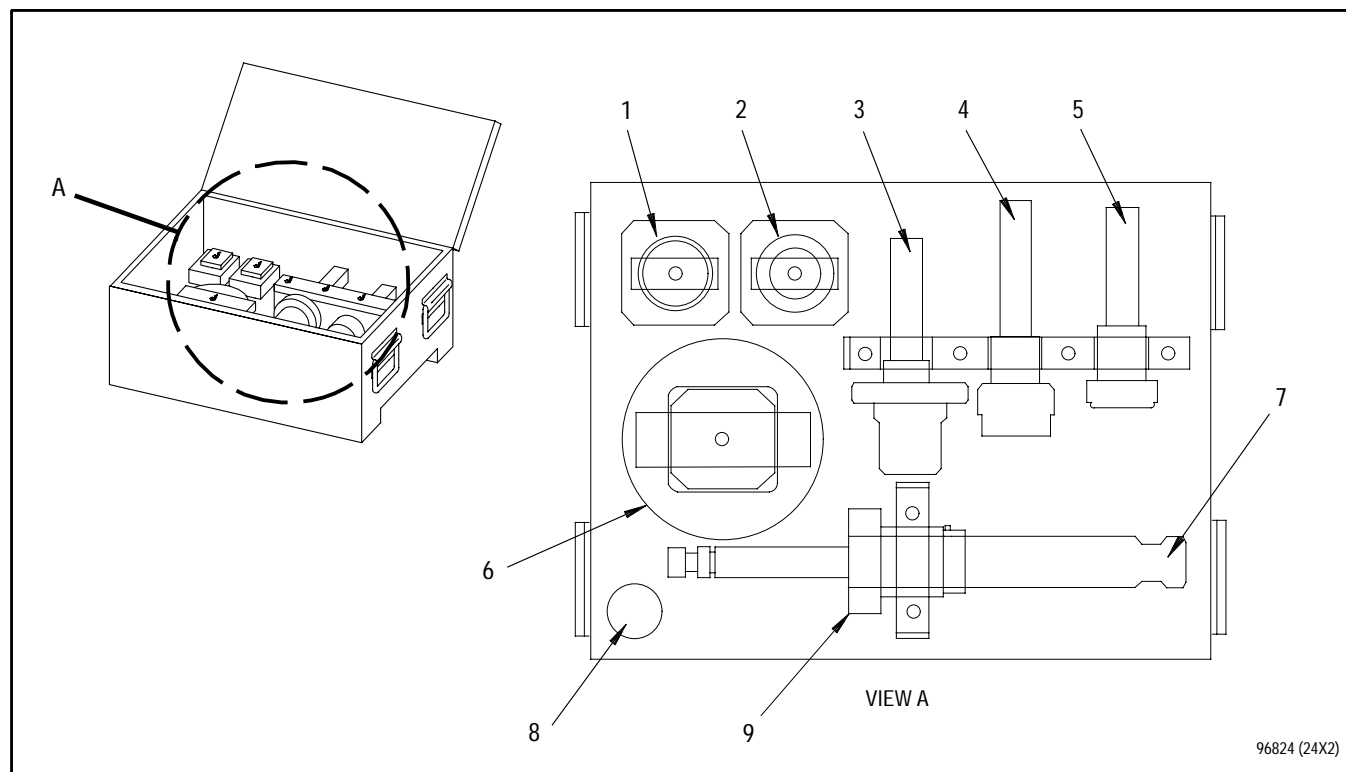


Figure 5A. PWA 57906 Adapter, PWA 57807, or PWA 57650 Adapter Set

Legend for figure 1

- | | | |
|----|---------------------------------------------------|------------|
| 1. | Retainer - No. 1 inner race retaining nut | Assembly A |
| 2. | Retainer Assembly | Assembly B |
| 3. | Adapter Assembly - No. 1 outer race retaining nut | Assembly C |
| 4. | Adapter Assembly - No. 1 inner race retaining nut | Assembly D |
| 5. | Adapter Assembly - compressor disk and hub | Assembly E |
| 6. | Sub Base | Assembly F |
| 7. | Adapter Assembly - turbine shaft nut | Assembly G |
| 8. | Cap Screws | Assembly H |
| 9. | Retainer - turbine shaft nut | Assembly I |

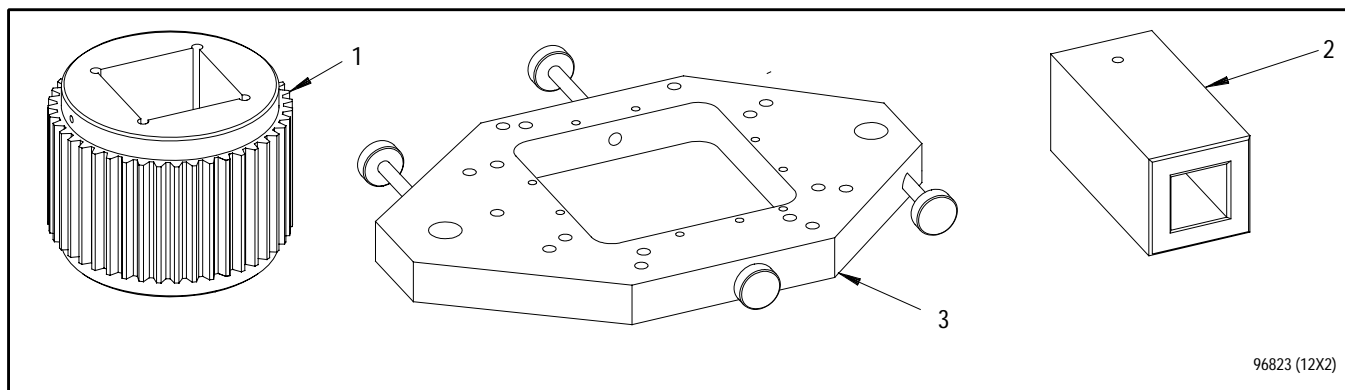


Figure 5B. PWA 57806 or PWA 57649 Adapter Set

Legend for figure 1A

- | | | |
|----|-------------------------|------------|
| 1. | Adapter Assembly | Assembly K |
| 2. | Wrench Adapter Assembly | Assembly L |
| 3. | Base Assembly | Assembly M |

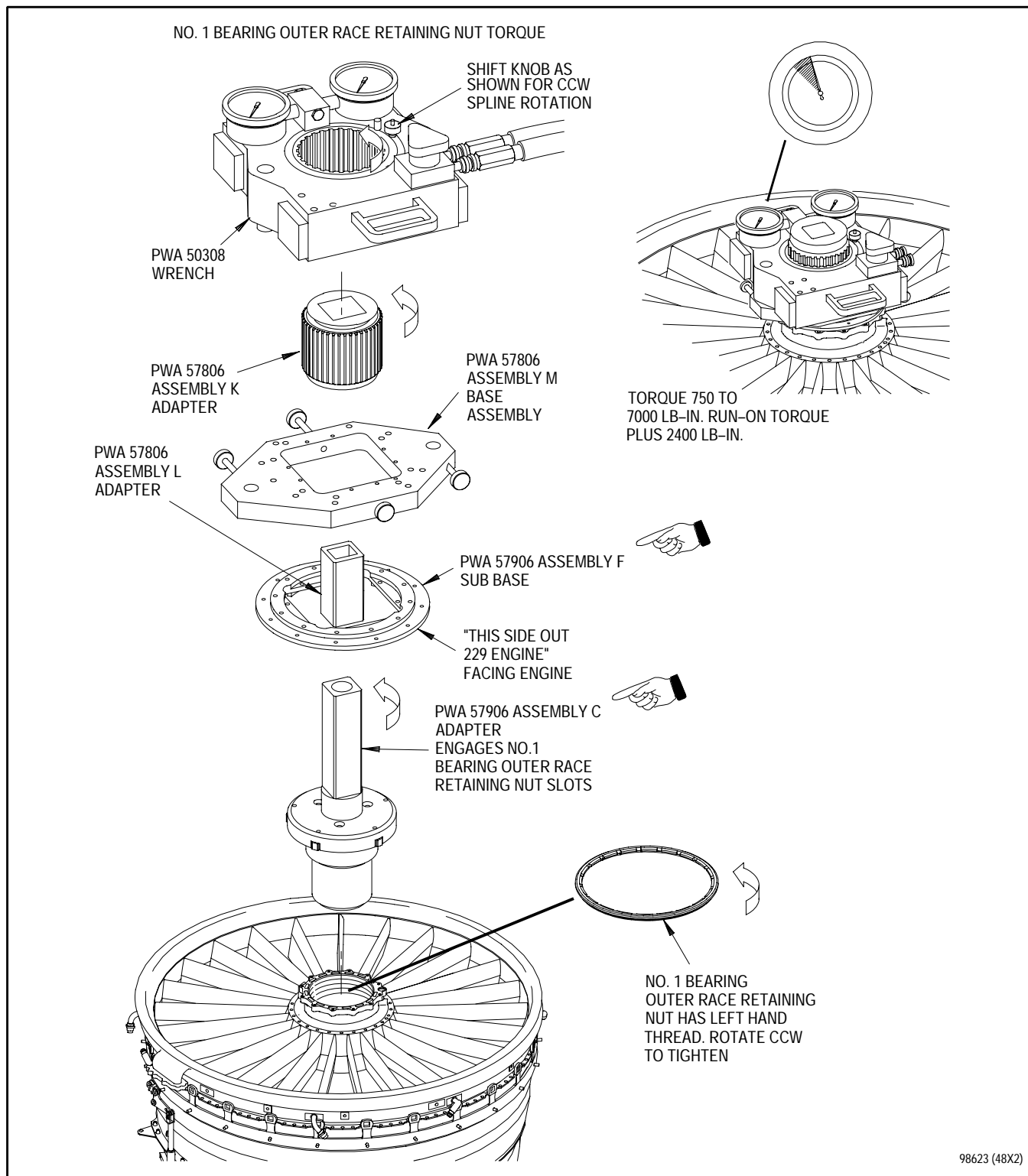


Figure 6. No. 1 Bearing Outer Race Retaining Nut - Torque

NOTE

- Operating instructions for PWA 50308 wrench are found in T.O. 32B14-5-2-1.
- Counterclockwise direction is determined by viewing module from front of engine.
 - (9) Actuate wrench and torque nut to run-on torque of 750 to 7000 pound-inches plus 2400 pound-inches. PWA 57906 assembly C adapter will turn counterclockwise.
 - (10) Remove tooling.
 - (11) Ensure quad N1 sensor cable and Ps2 heater cable are properly secured and will not interfere with path of drum rotor and wrench assembly. Interference during rotation will result in damage to cables.
 - (12) Install protective covers over inlet and No. 1 bearing area whenever area is not being worked.
- d. Install No. 1 bearing inner race retaining nut(2, figure 4) as follows:
 - (1) Apply a light coat of MIL-L-7808 engine oil to nylon locking feature and threads of inner race retaining nut(2).
 - (2) Thread inner race retaining nut(2) onto front hub with nylon insert facing forward.

- (3) Place PWA 57806 assembly M base assembly on bench with flat surface side down. Secure PWA 57906 assembly F sub base with side marked THIS SIDE OUT 229 ENGINE facing technician to base assembly using PWA 57906 assembly H cap screws per figure 7.
- (4) Install base assembly and sub base, as an assembly, onto No. 1 bearing housing with side marked THIS SIDE OUT 229 ENGINE facing engine. Secure with PWA 57906 assembly H cap screws.
- (5) Insert PWA 57906 assembly D adapter through square cut out in base assembly and engage drum rotor assembly inner diameter wrenching slots.
- (6) Unlock inner details of PWA 57615 rear retainer.
- (7) Install PWA 57906 assembly A retainer through square cut out in base assembly. Engage slots in inner race retaining nut by rotating drum rotor assembly as necessary.
- (8) Install PWA 57806 assembly L adapter assembly onto PWA 57906 assembly D adapter.
- (9) Install PWA 57806 assembly K adapter assembly onto PWA 57806 assembly L adapter assembly and secure with set screw. Engage and tighten PWA 57806 base assembly retaining screws fingertight.
- (10) Using hoist and suitable nylon strap, install PWA 50308 hydraulic wrench onto PWA 57806 assembly M base assembly so drive pins of wrench engage holes in base assembly. Secure with thumbscrews.

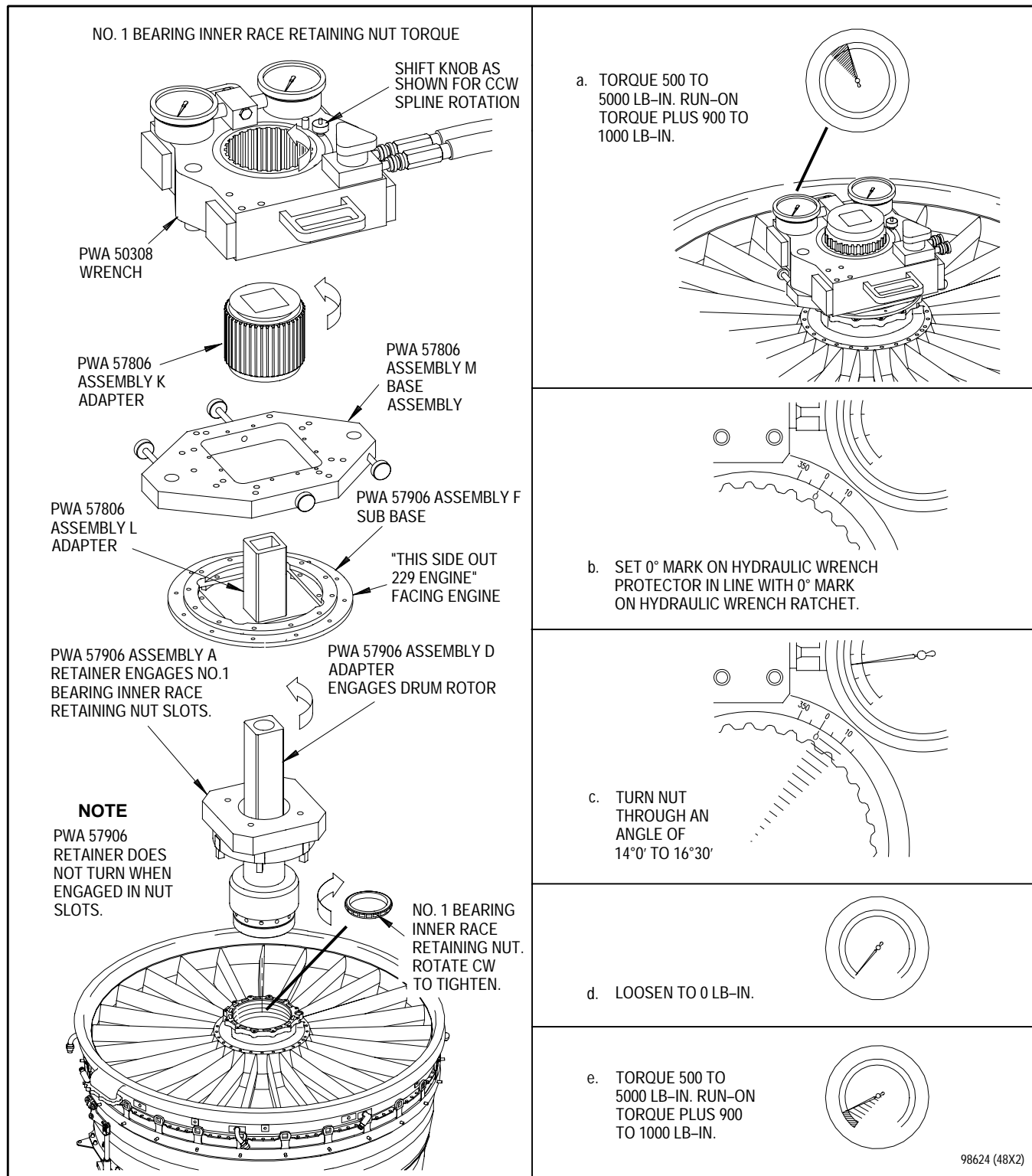


Figure 7. No. 1 Bearing Inner Race Retaining Nut - Torque (Sheet 1 of 2)

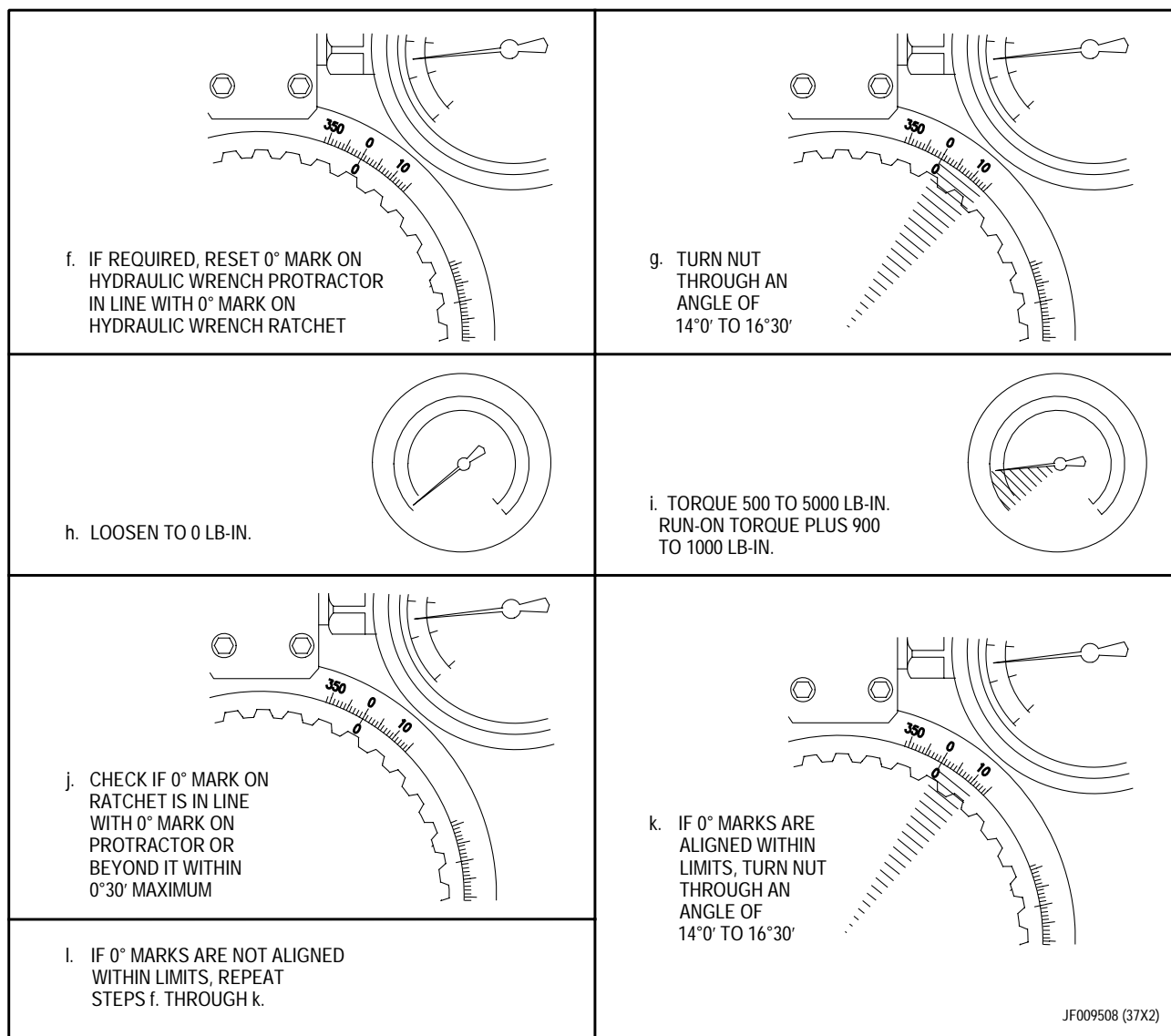


Figure 7. No. 1 Bearing Inner Race Retaining Nut - Torque (Sheet 2 of 2)

NOTE

- Operating instructions for PWA 50308 wrench are found in T.O. 32B14-5-2-1.
 - Counterclockwise direction is determined by viewing module from front of engine.
- (11) Actuate pump and torque retaining nut per figure 7. PWA 57906 assembly D adapter will turn counterclockwise.
- (12) Remove tooling.

- e. Using depth micrometer and parallel bar, measure distance from front face of installed No. 1 bearing inner race retaining nut to front face of hub (Dimension E) per figure 8. Record Dimension E.
- f. Dimension E must be equal to or greater than calculated dimension recorded in figure 3, step f. If dimension E is not within limits, remove inner race retaining nut and retorque.
- g. Cover front of fan inlet case with protector if engine assembly is interrupted.

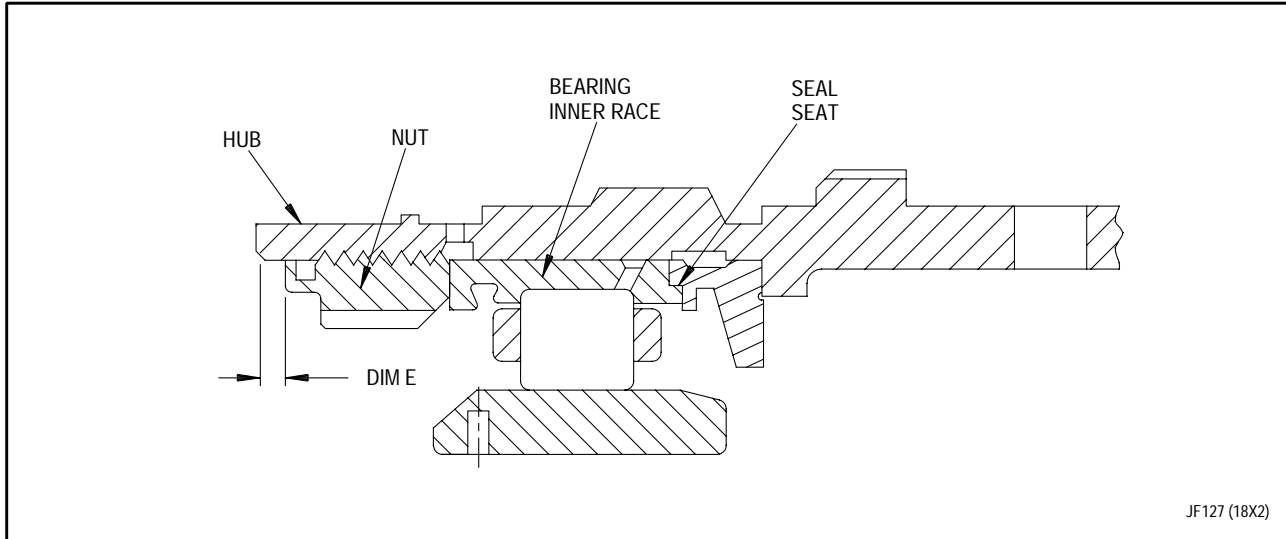


Figure 8. No. 1 Bearing Position Measurement - Final Check

WORK PACKAGE**TECHNICAL PROCEDURES****EXTERNAL PARTS, INLET/FAN MODULE -****INSTALLATION****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 20

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2	30	7 - 8	0	13	16
2A	21	9	19	14	2
2B Blank Added	15	10	0	15	11
3	21	11	15	16	16
4 - 5	7	12	0	17 - 18	11
6	12				

REFERENCE MATERIAL REQUIRED

Title	Number
Introduction and General Information - - - - -	T.O. 2J-F100-53-1
General Repair Procedures - Compound, Antigalling (PWA 36545)	
Application (SPOP 748) - - - - -	SWP 098 07

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

T.O. No.	Date	Level	Title (ECP No.)
2J-F100229-546	30 Sep 95	O/I, D	Modification of Retainer Ball Lock Pin Handle PWA 57614, F100-PW-229 Engine, F-15/F-16 Aircraft (ECP 93QC038)
2J-F100229(I)-516	30 Nov 96	O/I	Replacement of PN 4075565 and PN 4075566 Compressor Inlet Variable Vane (CIVV) Actuator Rod Clevises, F100-PW-229 Engines, F-15 Aircraft (ECP 95QA027)

CONSUMABLE MATERIALS

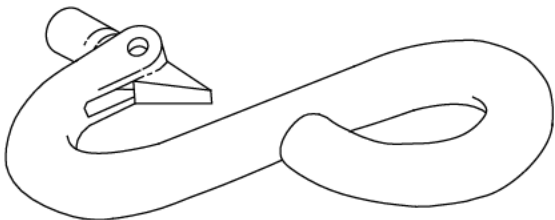
Nomenclature	Specification/Vendor Part Number
Compound, antigalling (PWA 550)	Hi-T-650 or Lubri-Bond HT
Compound, antigalling (PWA 36545)	EsnaLube 382
Lockwire (0.032 inch diameter)	MS9226-04
Solvent, petrolatum	P-D-680, Type II

EXPENDABLE ITEMS

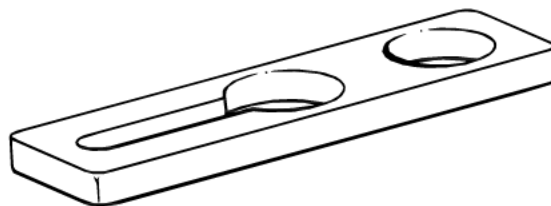
Nomenclature	Part Number	Quantity
Pin, cotter	MS9245-24	2
Washer, key	4068010	2
Washer, key	4077233	2
	or	
	4004816	

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
4	Front Compressor Stator Inlet Synchronizing Ring and Compressor Inlet Variable Vane Linkage System - Installation	
	Hook, Safety (two required) - - - - -	PWA 2388
	Adapter, Lift and trunnion (four required) - - - - -	PWA 26147
	Sling, Handling (two required) - - - - -	PWA 56336
	Retainer, Inlet/fan module, handling, front - - - - -	PWA 57614

ILLUSTRATED SUPPORT EQUIPMENT

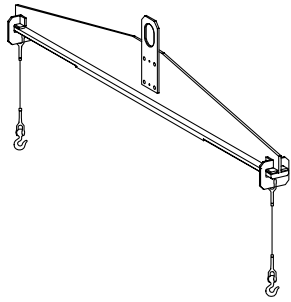
PWA 2388 -C

Figure T1. PWA 2388 Hook

PWA 26147 -C

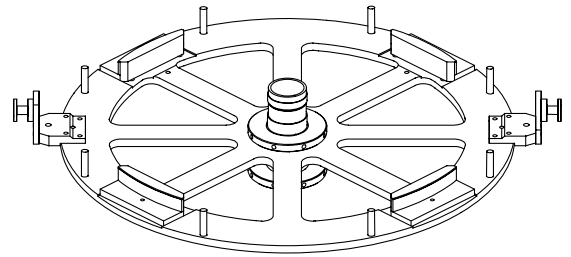
Figure T2. PWA 26147 Adapter

ILLUSTRATED SUPPORT EQUIPMENT (continued)



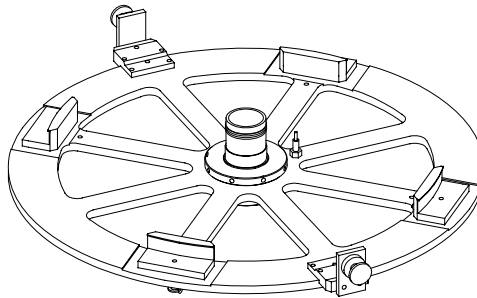
PWA 56336 -C

Figure T3. PWA 56336 Sling



PWA 57614 -C

Figure T4. PWA 57614 Retainer



PWA 57803 -C

Figure T5. PWA 57803 Retainer

1. INTRODUCTION.

- a. This work package contains instructions for installation of inlet/fan module external parts.

2. NO. 1 BEARING SCAVENGE TUBE ASSEMBLIES - INSTALLATION.

(See Figure 1.)

- a. Remove caps from tube coupling nuts(8, figure 1) and fan inlet case fittings(7).
- b. Lubricate threads of tube coupling nuts(8) using PWA 36545 antigalling compound.



- Failure to run down coupling nuts, tighten clamps, then torque coupling nuts may result in tube damage.
- Failure to hold mating tube case fittings with one wrench while turning tube coupling nuts with second wrench may result in tube damage.
- c. Install scavenge tubes(9) and torque tube coupling nuts(8) 200 to 225 pound-inches while holding mating case fittings(7) with another wrench.
- d. Lockwire coupling nuts using MS9226-04 lockwire.

3. Ps2 AIR TUBE ASSEMBLIES INSTALLATION.

(See figure 1.)

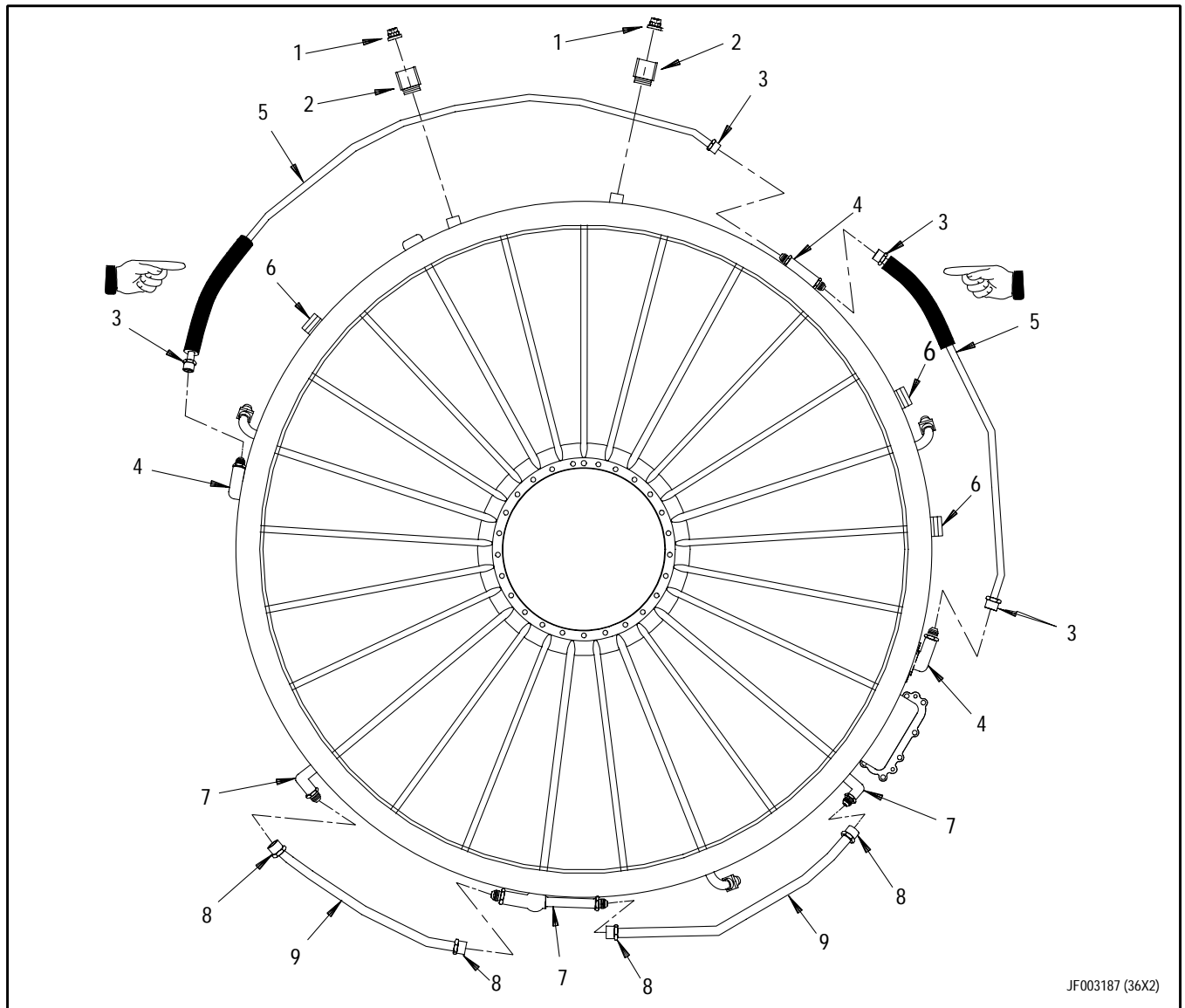
- a. Remove protective caps from tube coupling nuts(3, figure 1) and fan inlet case fittings(4).

- b. Apply a light coat of PWA 550 antigalling compound to threads of tube coupling nuts(3). Lubricate nuts(1) with PWA 36545 antigalling compound.



- Failure to run down coupling nuts, tighten clamps, then torque coupling nuts may result in tube damage.
- Failure to hold mating tube case fittings with one wrench while turning tube coupling nuts with second wrench may result in tube damage.
- c. Install Ps2 air tubes/flexible hoses(5), clamps(2 and 6), nuts(1) fingertight. Ensure shorter bend length of tube is down (3:30 position) to prevent backward tube installation. Torque all clamp nuts 27 to 30 pound-inches. Torque tube coupling nuts(3) 65 to 75 pound-inches while holding mating case fittings(4) with another wrench. Ensure coupling nuts on hose end of hose/tube assembly is torqued last.

- d. Lockwire coupling nuts using MS9226-04 lockwire.



JF003187 (36X2)

Figure 1. No. 1 Bearing Scavenge Tube Assemblies, and Ps2 Air Tube Assemblies - Installation

- | | |
|---------------------------|---------------------------|
| 1. Nut | 6. Block Clamp |
| 2. Loop Clamp | 7. Fan Inlet Case Fitting |
| 3. Tube Coupling Nut | 8. Tube Coupling Nut |
| 4. Fan Inlet Case Fitting | 9. Scavenge Tube |
| 5. Ps2 Tube* | |

*PNs 4081114-01 and 4081099-01 nickel-base tubes are partially non-metallic (flexible). PNs 4071695-01 and 4071694-01 stainless steel tubes are completely rigid.

4. FRONT COMPRESSOR STATOR INLET SYNCHRONIZING RING AND COMPRESSOR INLET VARIABLE VANE LINKAGE SYSTEM - INSTALLATION.

(See Figures 2, 3 and 4.)

- a. Lubricate nuts(4, figure 2) with PWA 36545 antigalling compound.
- b. Install bolt(2) and nut(4) to secure connecting link(3) to synchronizing ring(1). Torque nut(4) 62 pound-inches. Then tighten nut as required to align lockwire holes. Do not exceed 72 pound-inches.
- c. Position bell crank assembly(5) as shown in figure 2. Install bolt(2) and nut(4) to secure bell crank assembly(5) to connecting link(3). Torque nut(4) 62 pound-inches. Then tighten nut as required to align lockwire holes. Do not exceed 72 pound-inches. Lockwire bolts(2) using MS9226-04 lockwire.
- d. Slide synchronizing ring towards front of module with lever arms(1, figure 3) facing up.

NOTE

Installation procedure for CIVV linkage system applies to both sides of engine.

- e. Install bell crank assembly support(7) as follows:
 - (1) Apply a light coat of PWA 550 antigalling compound to bolts(8 and 4).
 - (2) Install bell crank support(7) and secure using bolts(8). Torque bolts(8) 54 to 60 pound-inches and lockwire using PN MS9226-04 lockwire.
 - (3) Rotate synchronizing ring to engage bell crank assembly into bell crank support(7).

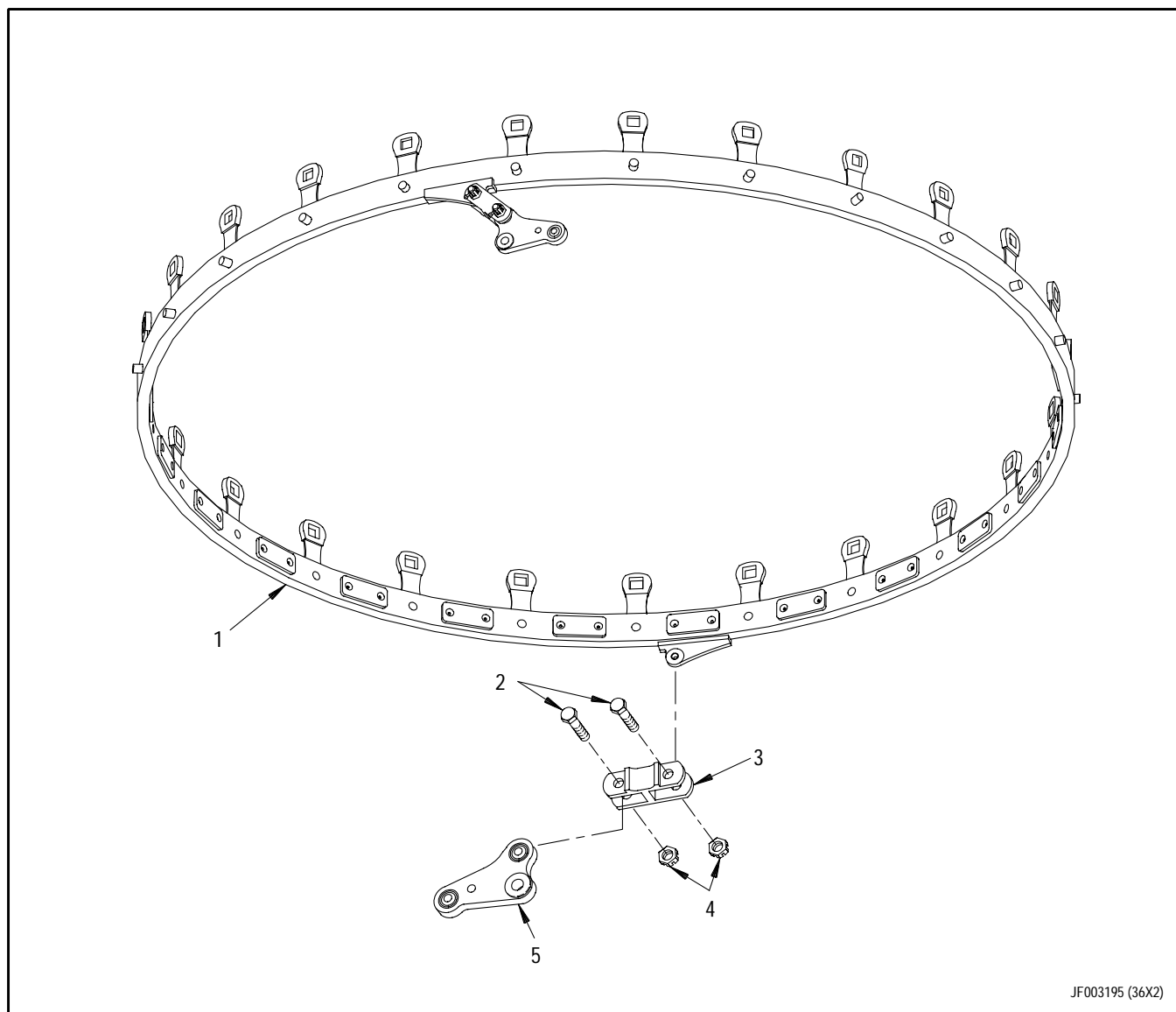
See figure 3. Synchronizing ring can be installed in only one position.

- f. Lift and position lever arms(1) onto variable vane attachment points.
- g. If required, remove bolts securing Ps2 tube elbow located at 11:00 o'clock position to allow removal of synchronizing ring lever arm at that location. Install elbow bolts and torque 23 to 26 pound-inches. Lockwire bolts using PN MS9226-04 lockwire.
- h. Apply light coat of PWA 36545 antigalling compound to threaded area of bolt(3). Do not apply PWA 36545 antigalling compound to self locking nylon insert.
- i. Ensure that locking (run-on) torque of bolts is within 2 to 13 pound-inches. Replace bolts not within limits.
- j. Install washers(2) and bolts(3) to secure variable vanes to lever arms(1). Torque bolts(8) 27 to 30 pound-inches.
- jl. Check each variable vane for trailing edge flap play of 0.050 inch maximum. Replace parts causing excessive looseness.



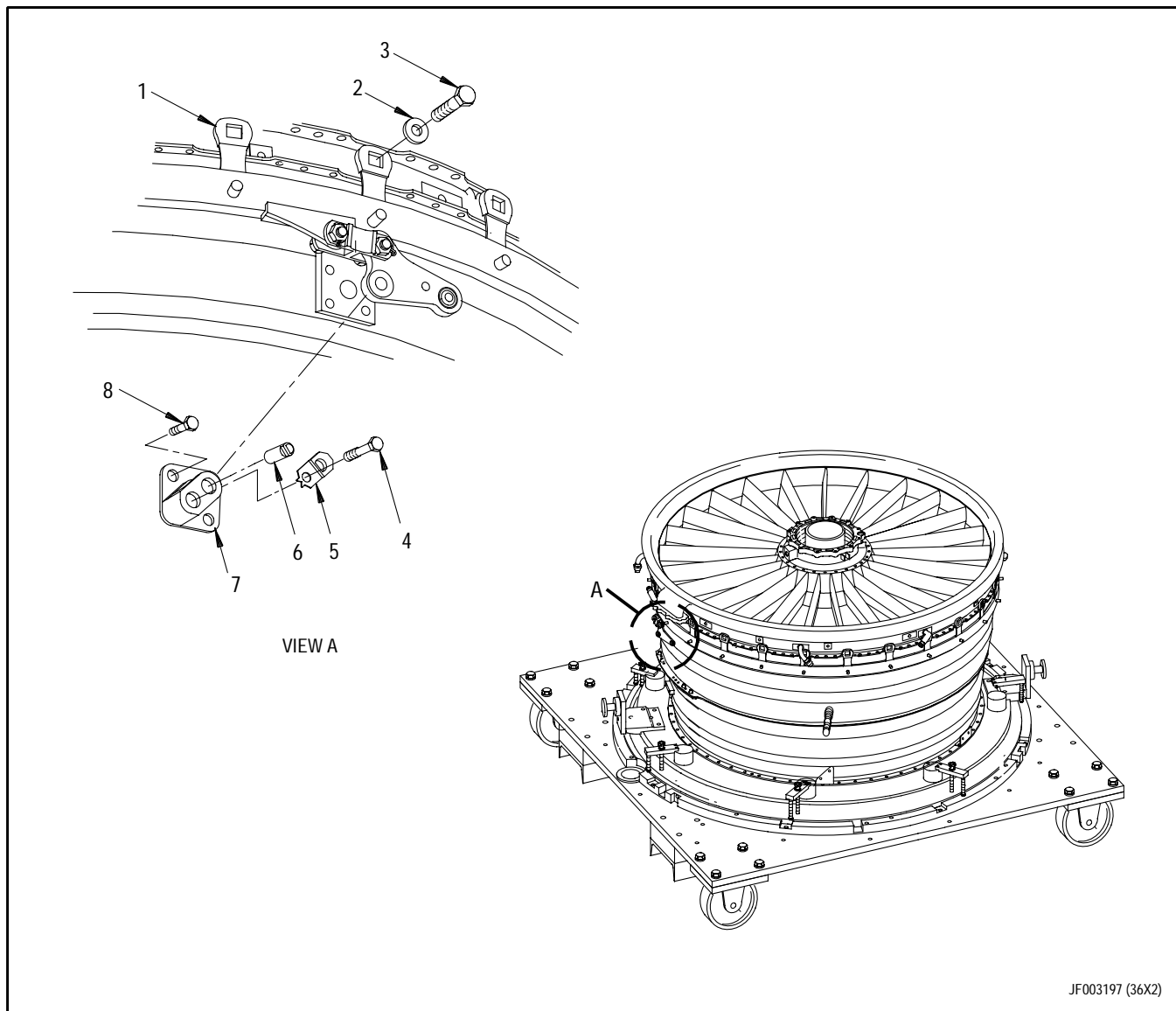
Ensure at least one tab of key washer(5) is bent flush against flat of hex bolt head to prevent backing out of bolt, which could result in loss of CIVV control.

- k. Install shoulder pin with new key washer(5), and bolt(4) to secure bell crank assembly to bell crank support(7). Torque bolt(4) 45 to 60 pound-inches and bend tabs of key washer(5) against flats of bolt(4).



1. Synchronizing ring
2. Bolt
3. Connecting link
4. Nut
5. Bell crank assembly

Figure 2. Front Compressor Stator Inlet Synchronizing Ring and Compressor Inlet Variable Vane Linkage System - Bell Crank Assembly and Connecting Link Installation



1. Lever arm
2. Washer
3. Bolt
4. Bolt
5. Key washer
6. Shoulder pin
7. Bell crank support
8. Bolt

Figure 3. Front Compressor Stator Inlet Synchronizing Ring and Compressor Inlet Variable Vane Linkage System - Installation

1. Rotate inlet/fan module to front end down position as follows:

- (1) Install PWA 57803 front retainer as follows:

NOTE

- PWA 57803 retainer contains PWA 57614 details.
- Two technicians are required for installation of PWA 57614 detail-1.
 - (a) With two technicians, thread PWA 57614 retainer detail-2 shaft(4, figure 4, sheet 1) onto drum rotor shaft until it bottoms out.
 - (b) Thread detail-3 lower nut(1) approximately 1/4 inch beyond end of threads on detail-2 shaft(4).
 - (c) Loosen detail-20 bolts(8) and position detail-5 slide jaw(5) inward.
 - (d) Using overhead hoist, PWA 26147 adapters, PWA 56336 sling, and PWA 2388 hook, lower detail-1 base(2). Align guide pin with locator hole on fan inlet case ID flange.
 - (e) Move slide detail-5 jaw(5) outward until they fully engage slot(6) in fan inlet case(7). Secure using ball lock pin(3). Tighten 8 detail-20 bolts(8).
 - (f) Tighten lower detail-3 nut(1) until snug against detail-1 base(2).

- (g) Thread upper detail-3 nut(1) onto detail-2 shaft(4) until snug against detail-1 base(2).

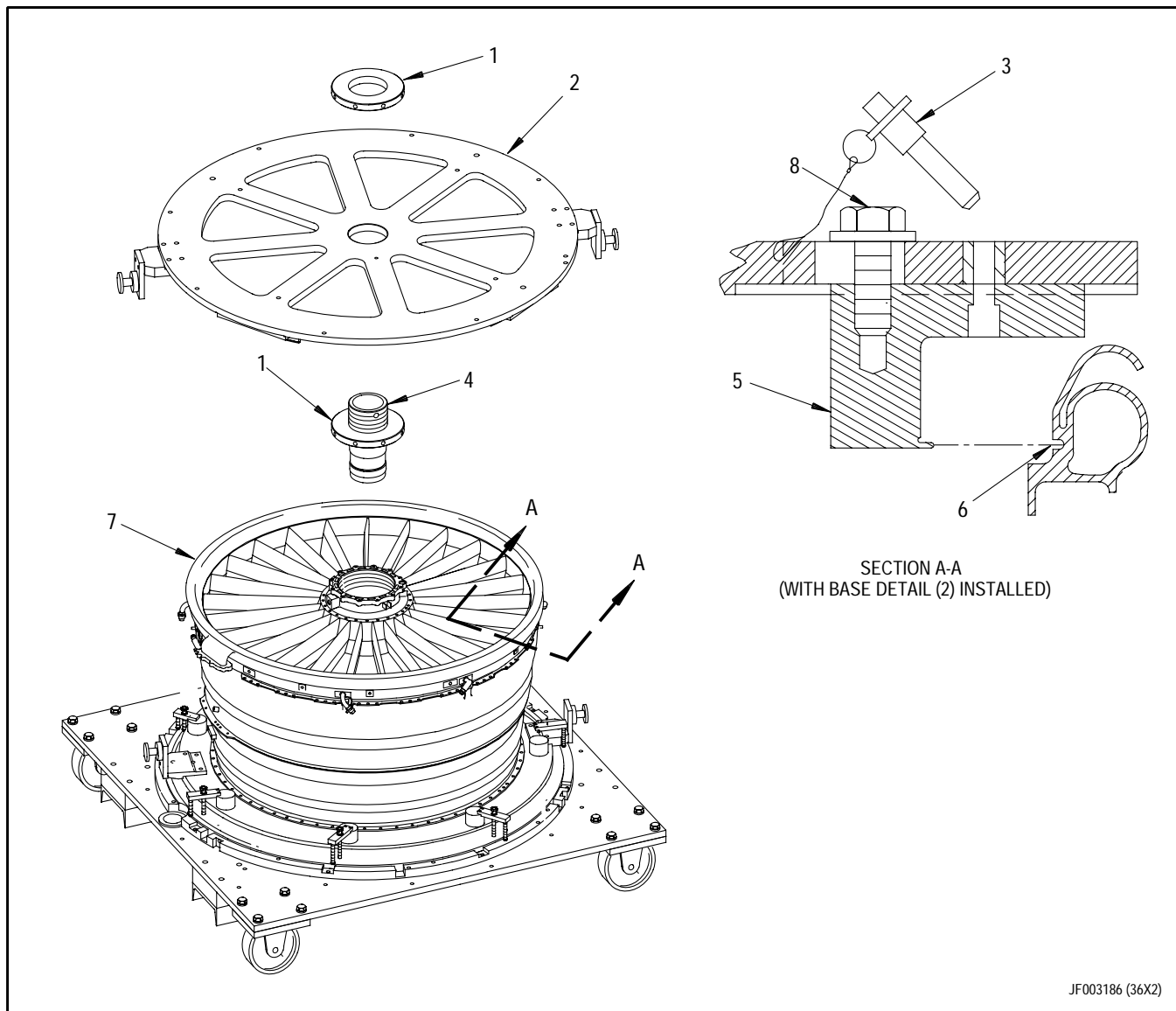
- (2) Attach PWA 26147 adapters, PWA 56336 slings, and PWA 2388 hooks onto spools of PWA 57615 rear retainer and PWA 57803 front retainer as shown in figure 4, sheet 2.
- (3) Loosen nuts on clamps of PWA 56338 stand and swing clamps to one side.
- (4) Using two overhead hoists, carefully lift and rotate inlet/fan module to front end down position.
- (5) Lower inlet/fan module onto stand and secure using clamps.

- m. Remove PWA 57615 rear retainer as follows:

NOTE

Dowel pins(1, figure 4, sheet 3) indicate position of locking legs(4).

- (1) Loosen nuts(2) securing locking legs(4) of inner detail(3) and turn locking legs(4) inward.
- (2) Remove cap screw assemblies(5) securing retainer to inlet/fan module.
- (3) Using overhead hoist, PWA 26147 adapters, PWA 56336 sling, and PWA 2388 hook, lift and remove retainer.



1. Nut detail
2. Base detail
3. Ball lock pin
4. Shaft detail
5. Slide jaw detail
6. Slot
7. Fan inlet case
8. Bolt

Figure 4. Rotating Inlet/Fan Module to Front End Down Position (Sheet 1 of 3)

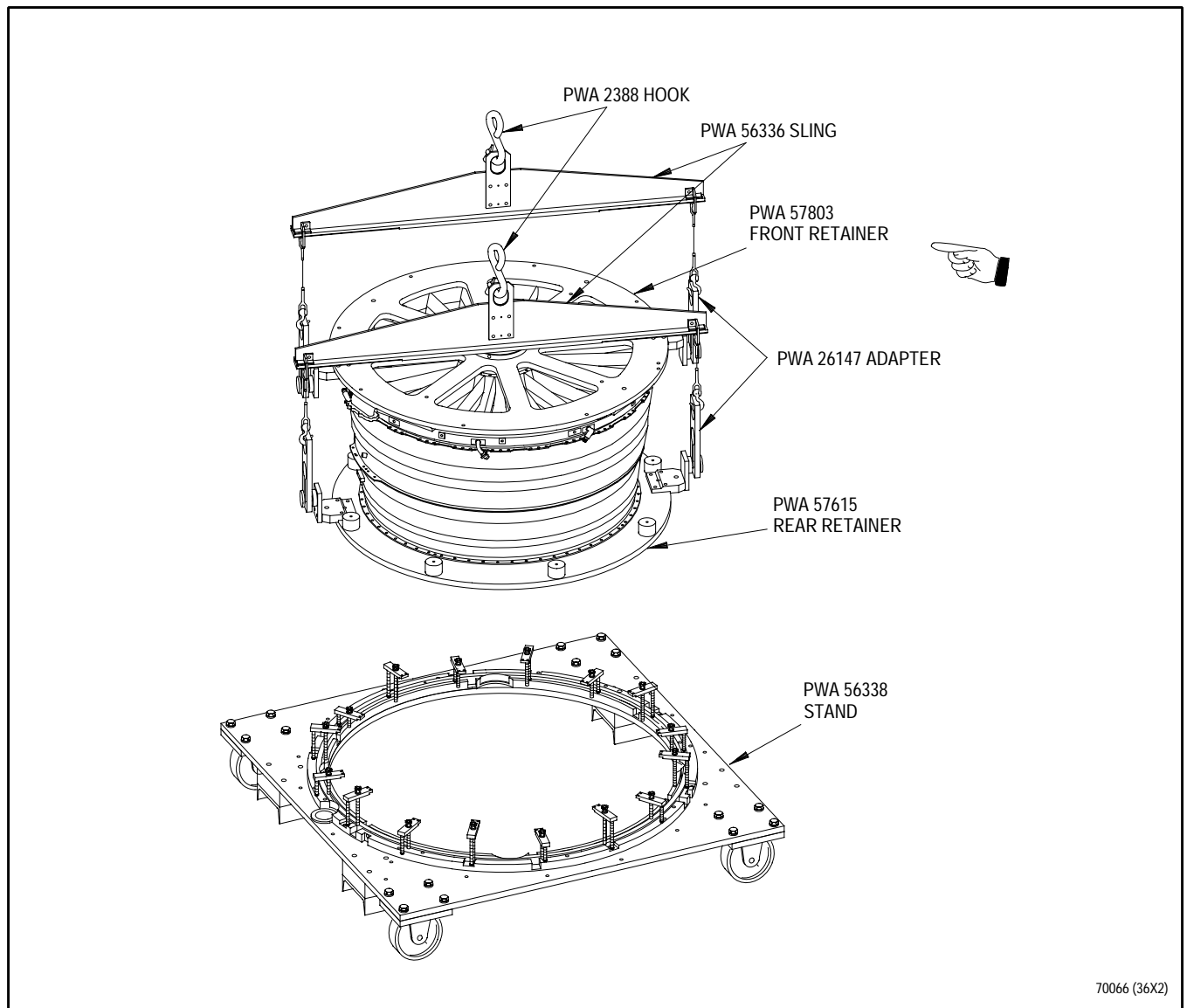
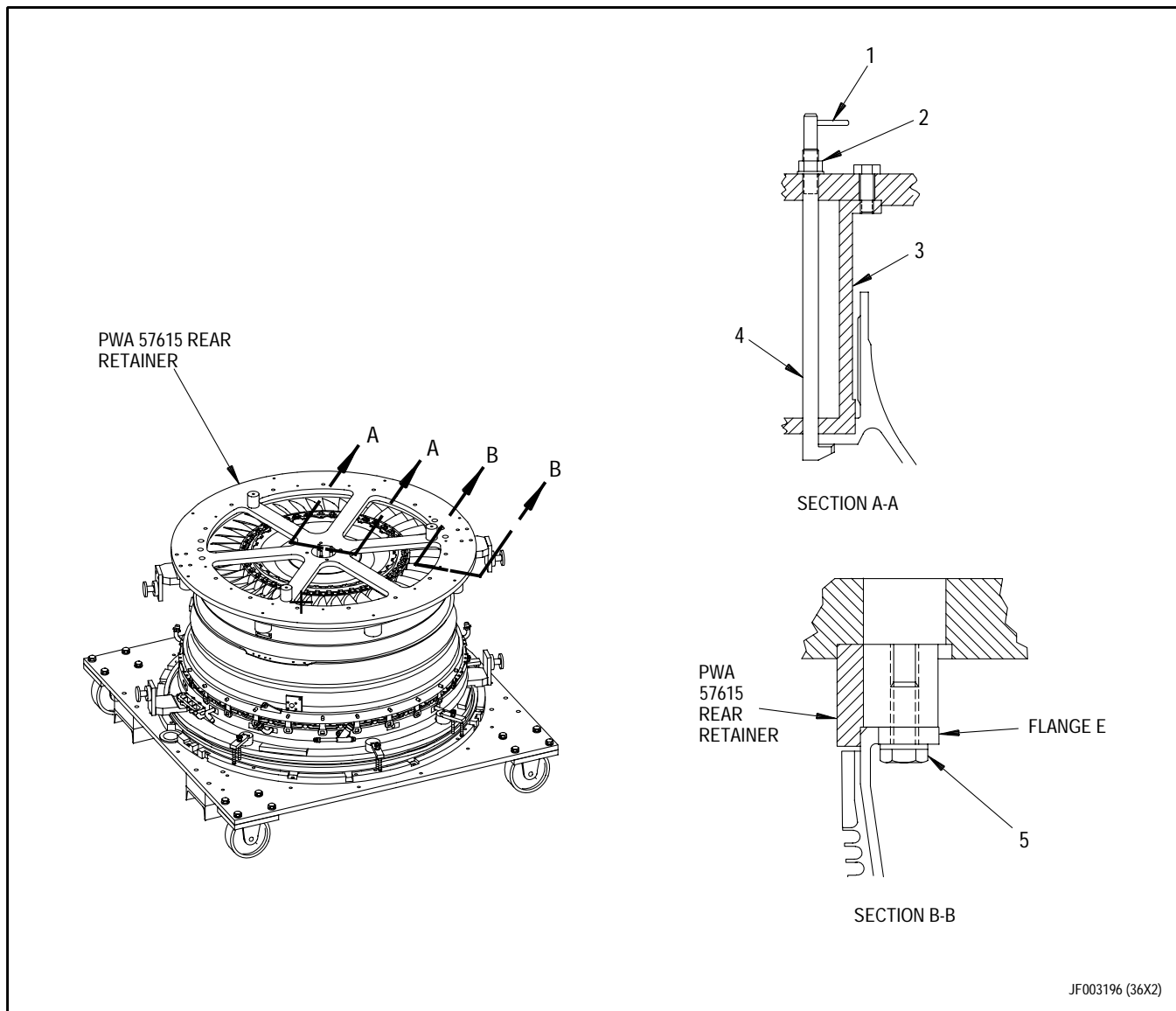


Figure 4. Rotating Inlet/Fan Module to Front End Down Position (Sheet 2 of 3)



1. Dowel pin
2. Nut
3. Inner detail
4. Locking leg
5. Cap screw assembly

Figure 4. Rotating Inlet/Fan Module to Front End Down Position (Sheet 3 of 3)

5. COMPRESSOR INLET VARIABLE VANE CONTROL AND CYLINDER - INSTALLATION.

(See Figures 5 and 6.)

a. Install control and cylinder attaching parts as follows:

- (1) If required, remove corrosion preventive compound from cylinder rod of control and cylinder by wiping with clean cloth moistened with P-D-680, Type II petroleum solvent.

NOTE

There are two configurations of clevis: V-slot and square slot. Key washer and torque are different for each configuration.

- (2) Lubricate threads of clevis with PWA 36545 antigalling compound.

- (3) Install sleeve nut on clevis beyond first set of threads. Refer to figure 5.

- (4) Sleeve nut shall not be tightened at this time.

- (5) First set of threads on clevis shall not extend beyond end of cylinder rod.

- (6) Second set of threads on clevis shall not extend beyond end of sleeve nut.

- (6a) Choose proper PN key washer for V-slot or square slot clevis. (See figure 5.)

- (7) Place new key washer on clevis, align tab of key washer with cylinder rod slot, and thread clevis into cylinder rod of control and cylinder.

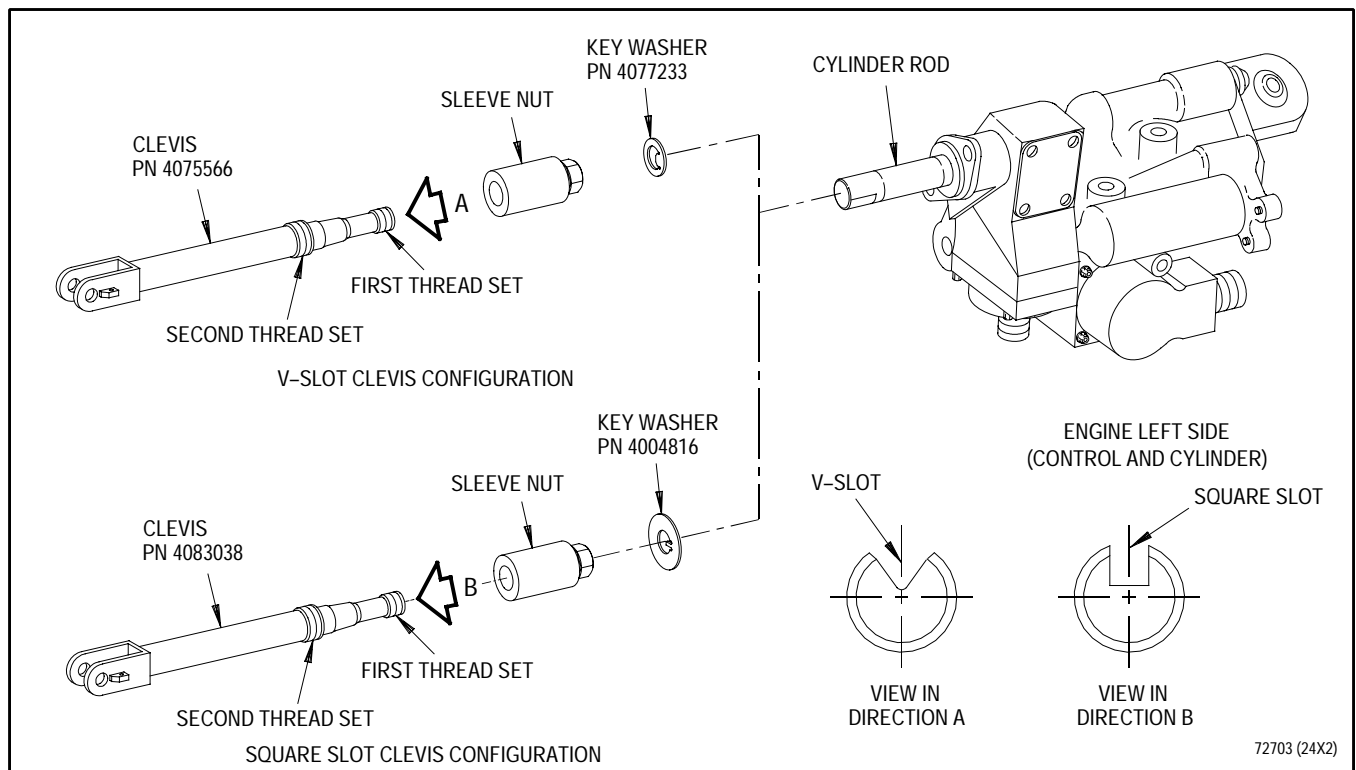


Figure 5. Compressor Inlet Variable Vane Control and Cylinder Attaching Parts - Installation

b. Install support assembly(23, figure 6), bracket assembly(18), and connecting link(16) as follows:

- (1) Lubricate bolt(6) with PWA 550 antigalling compound and nut(22) with PWA 36545 antigalling compound.
- (2) Install support assembly(23) using bolts(6), nuts(22), and screws (2). Torque nuts(22) 27 to 30 pound-inches and screws(2) 23 to 26 pound-inches.
- (3) Lubricate bolts(19) with PWA 550 antigalling compound.
- (4) Install bracket assembly(18) using bolts(19). Torque bolts 23 to 26 pound-inches.
- (5) Lockwire bolts(PN ST2016-16 only) using MS9226-04 lockwire.
- (6) Install nut(17) and bolt(20) to secure connecting link(16) to bracket assembly(18). Torque nut(6) 27 to 30 pound-inches.

c. Install control and cylinder(7) as follows:

- (1) Lubricate bolts(21 and 3) with a light coat of PWA 550 antigalling compound.
- (2) Position control and cylinder(7) so that mounting lug rests between ears of support assembly(23). Install bolt(3) and nut(5). Torque nut(5) 62 pound-inches. Then tighten nut until cotter pin holes align. Do not exceed 72 pound-inches. Install new cotter pin(4).
- (3) Install lower lug of control and cylinder(7) into connecting link(16) and secure with bolt(21) and nut(15). Torque nut(15) 62 to 72 pound-inches.
- (4) Do not attach clevis(13) to bell crank assembly at this time.

Legend for figure 6

- | | |
|-------------------------|----------------------|
| 1. Borescope plug | 13. Rod end clevis |
| 2. Screw | 14. Sleeve nut |
| 3. Bolt | 15. Nut |
| 4. Cotter pin | 16. Connecting link |
| 5. Nut | 17. Nut |
| 6. Bolt | 18. Bracket assembly |
| 7. Control and cylinder | 19. Bolt |
| 8. Key washer | 20. Bolt |
| 9. Clevis pin | 21. Bolt |
| 10. Bell crank assembly | 22. Nut |
| 11. Retainer | 23. Support assembly |
| 12. Cotter pin | |

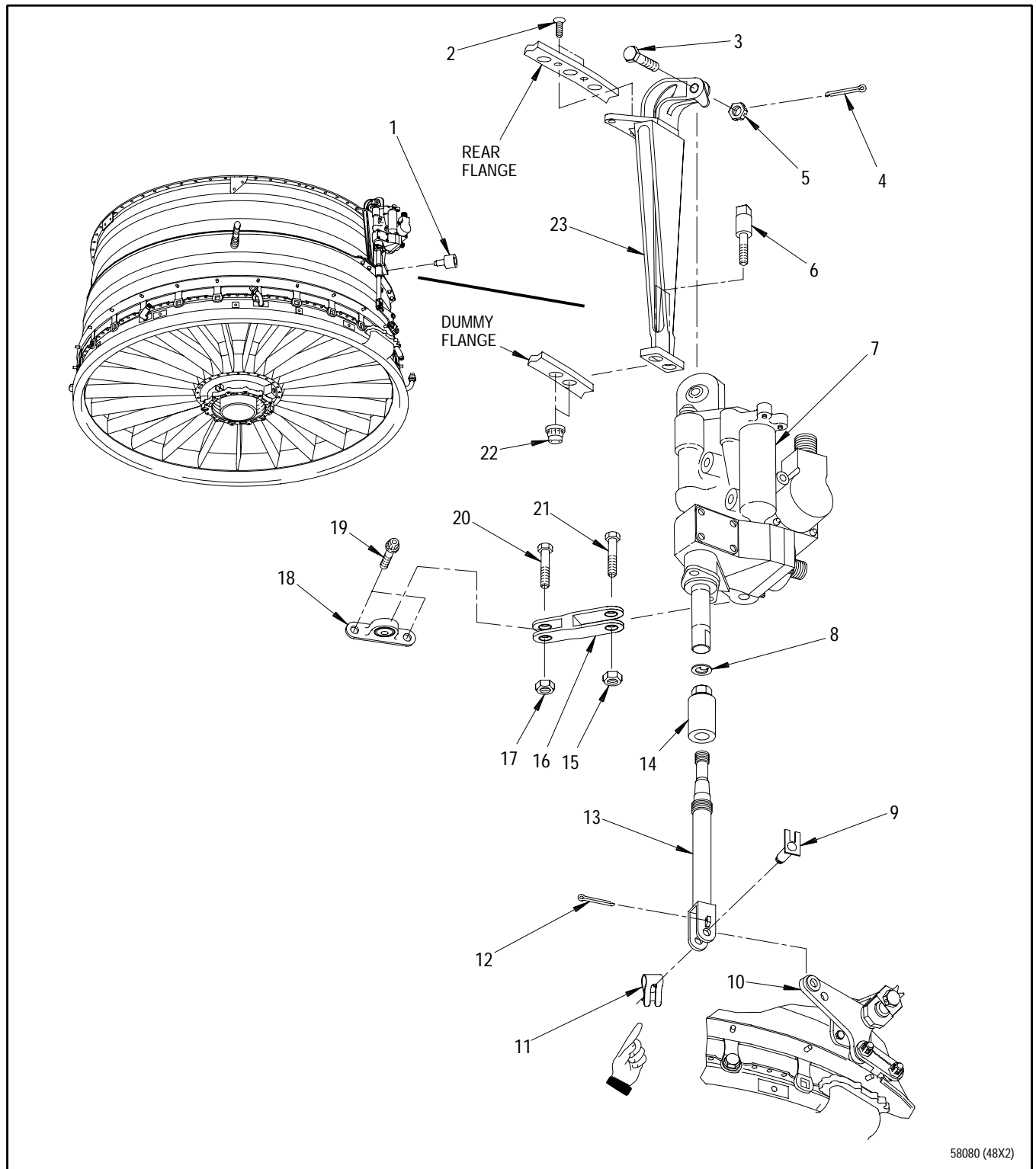


Figure 6. Compressor Inlet Variable Vane Control and Cylinder - Installation

6. COMPRESSOR INLET VARIABLE VANE LINEAR ACTUATING CYLINDER - INSTALLATION.

(See Figures 7 and 8.)

- a. Install linear actuating cylinder attaching parts as follows:

- (1) If required, remove corrosion preventive compound from cylinder by wiping with clean cloth moistened with P-D-680 petroleum solvent.

NOTE

There are two configurations of clevis: V-slot and square slot. Key washer and torque are different for each configuration.

- (2) Lubricate threads of rod end clevis with PWA 36545 antigalling compound.

- (3) Install sleeve nut on clevis beyond first set of threads per figure 7.

- (4) Sleeve nut shall not be tightened at this time.

- (5) First set of threads on clevis shall not extend beyond end of cylinder rod.

- (6) Second set of threads on clevis shall not extend beyond end of sleeve nut.

- (6a) Choose proper PN key washer for V-slot or square slot clevis. (See figure 7.)

- (7) Place new key washer on clevis and thread clevis into cylinder rod of linear actuating cylinder. Do not bend key washer at this time.

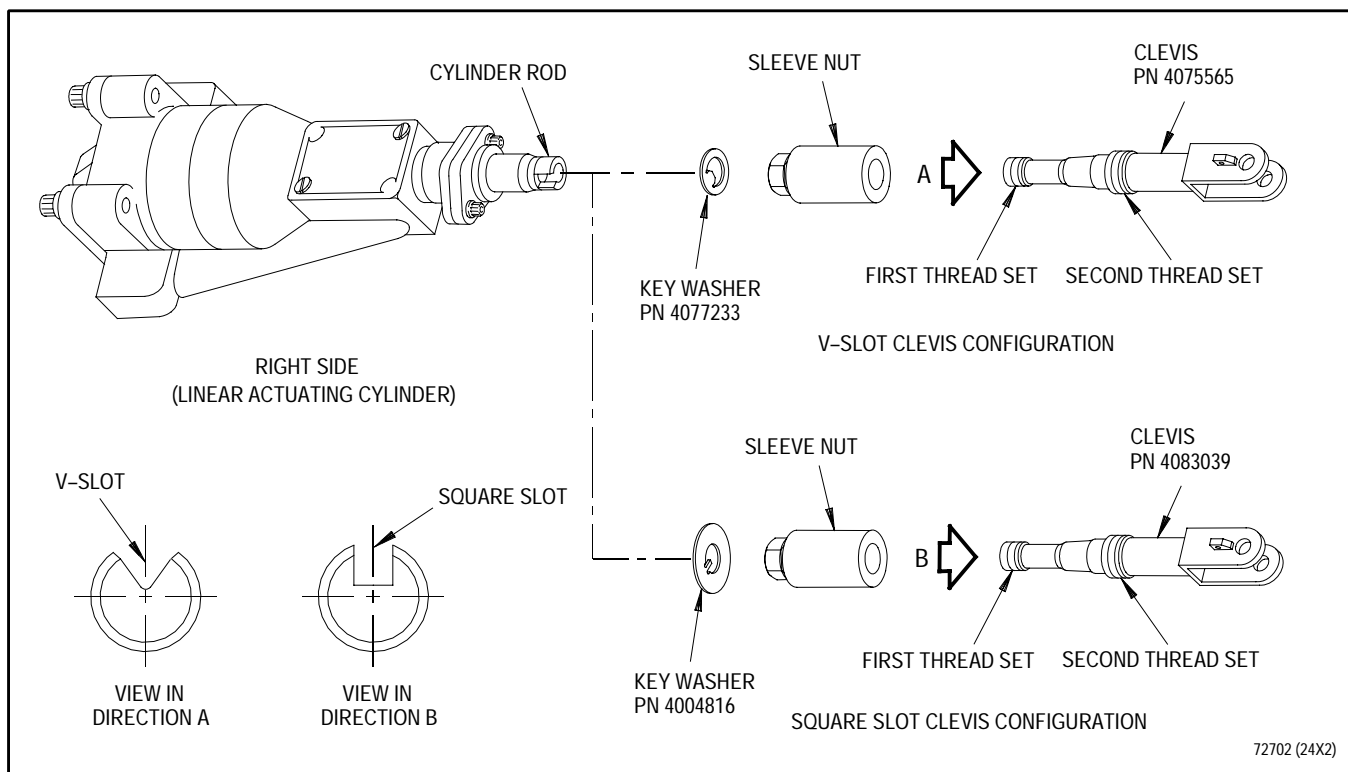
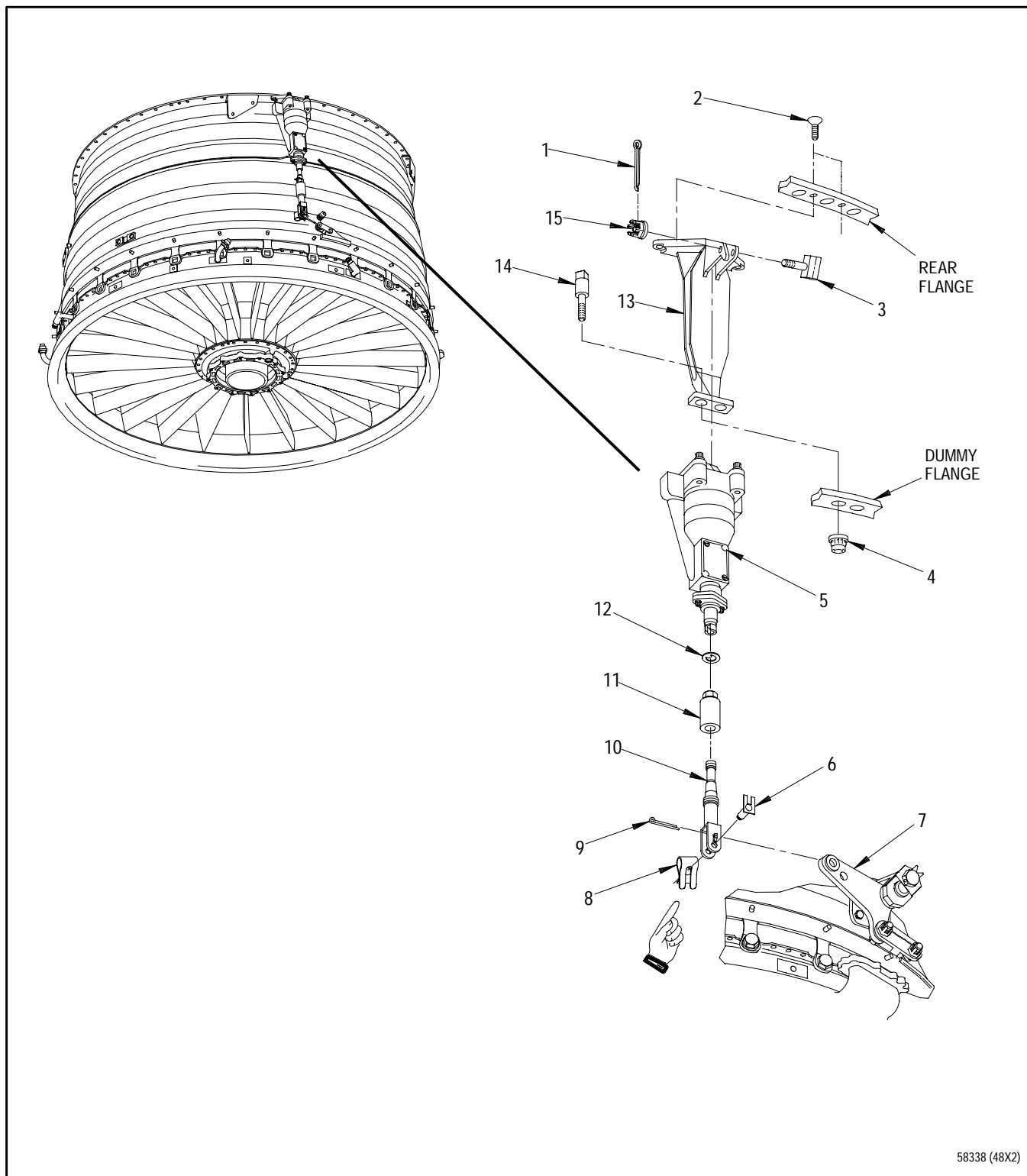


Figure 7. Compressor Inlet Variable Vane Linear Actuating Cylinder Attaching Parts - Installation

- b. Install support assembly(13, figure 8) as follows:
- (1) Lubricate nuts(4) with PWA 36545 antigalling compound.
 - (2) Install support assembly(13) using bolts(14), nuts(4), and screws(2) as shown in figure 8. Torque nuts(8) 27 to 30 pound-inches and screws(2) 23 to 26 pound-inches.
- c. Install linear actuating cylinder as follows:
- (1) Lubricate bolt(3) with a light coat of PWA 550 antigalling compound.
 - (2) Position linear actuating cylinder(5) so that mounting lug rests between ears of support assembly(13) and antirotation bracket on linear actuating cylinder(5) is towards top of engine.
 - (3) Install bolt(3) and nut(15) to secure linear actuating cylinder(5) to support assembly(13). Torque nut(15) 62 pound-inches. Then tighten until slots align with cotter pin hole in bolt. Do not exceed 72 pound-inches. Install new cotter pin(1).
 - (4) Do not attach clevis(10) to bell crank assembly(7) at this time.

Legend for figure 8

1. Cotter pin
2. Screw
3. Bolt
4. Nut
5. Linear actuating cylinder
6. Clevis pin
7. Bell crank assembly
8. Retainer
9. Cotter pin
10. Rod end clevis
11. Sleeve nut
12. Key washer
13. Support assembly
14. Bolt
15. Nut



58338 (48X2)

Figure 8. Compressor Inlet Variable Vane Linear Actuating Cylinder - Installation

WORK PACKAGE**TECHNICAL PROCEDURES****COMPRESSOR INLET VARIABLE VANE (CIVV) CYLINDER SYSTEM -****RIGGING****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 18

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	23	5 - 6	8	10 - 11	8
2	21	7	13	12	0
2A	8	8 Blank	13	13 - 14	13
2B Blank	8	9	0	15	16
3 - 4	0			16	13

REFERENCE MATERIAL REQUIRED

Title	Number
Operating and Maintenance Instructions with IPB - Test Equipment, Compressor Vane Positioning TTU-372/E - - - -	T.O. 33D4-6-617-1

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

T.O. No.	Date	Level	Title (ECP No.)
T.O. 2J-F100229(I)-516	30 Nov 96	O/I	Replacement of PN 4075565 and PN 4075566 Compressor Inlet Variable Vane (CIVV) Actuator Rod Clevises, F100-PW-229 Engines, F-15 Aircraft (ECP 95QA027)

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Oil, lubricating or Petrolatum	MIL-L-7808 or VV-P-236

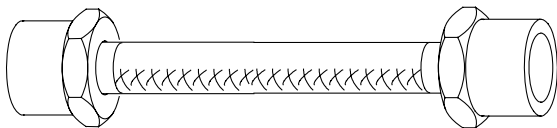
EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
Packing, preformed	MS9966-04	3
Packing, preformed	MS9966-06	4
Pin, cotter	MS9245-24	2

APPLICABLE SUPPORT EQUIPMENT

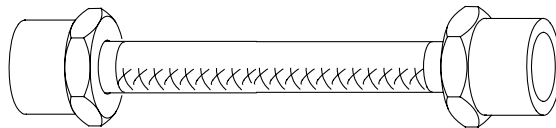
Paragraph	Function - Tool Nomenclature	Tool Number
2	Compressor Inlet Variable Vane Cylinder System - Rigging	
	Pin, Rigging, Compressor inlet variable vane - - - - -	LM 1008
	Hose Assembly, No. 4, 1 footlength - - -	LM 1005
	Hose Assembly, No. 4, 5 footlength - - -	LM 1006
	Hose Assembly, No. 6, 1 footlength - - -	LM 1007
	Test Equipment, Hydraulic pressure - -	PWA 50096
	Adapter, Compressor inlet variable vane control (return) - - - - -	PWA 51432
	Adapter, Compressor inlet variable vane control (extend) - - - - -	PWA 51472
	Adapter, Compressor inlet variable vane control (retract) - - - - -	PWA 51473

ILLUSTRATED SUPPORT EQUIPMENT



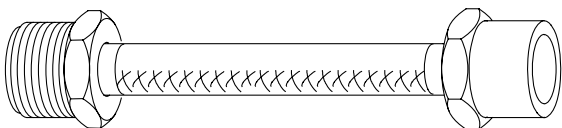
LM 1005

**Figure T1. LM 1005 Hose Assembly, No. 4, 1
Foot Length**



LM 1006

**Figure T2. LM 1006 Hose Assembly, No. 4, 5
Foot Length**



LM 1007

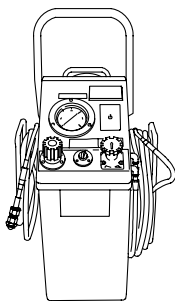
**Figure T3. LM 1007 Hose Assembly, No. 6, 1
Foot Length**



LM 1008

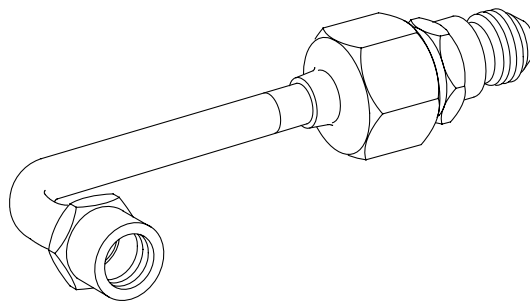
Figure T4. LM 1008 Pin, Rigging

ILLUSTRATED SUPPORT EQUIPMENT (continued)



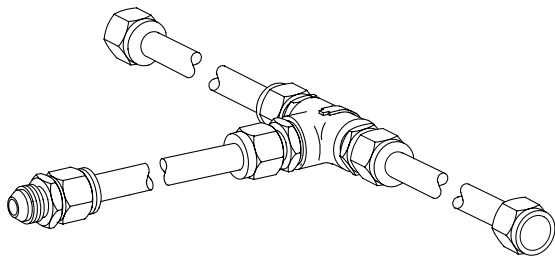
PWA 50096 -C

Figure T5. PWA 50096 Test Equipment



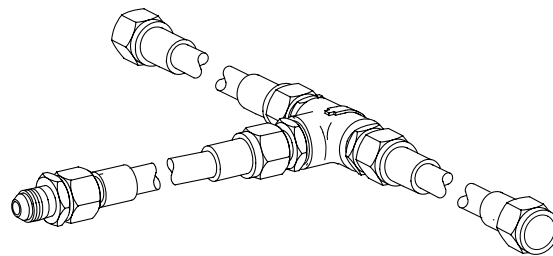
PWA 51432 -C

Figure T6. PWA 51432 Adapter



PWA 51472 -C

Figure T7. PWA 51472 Adapter



PWA 51473 -C

Figure T8. PWA 51473 Adapter

1. INTRODUCTION.

- a. This work package contains instructions for rigging compressor inlet variable vane (CIVV) cylinder system.
- b. Compressor inlet variable vane rigging, unlike other rigging procedures, is a modular function. It is performed on inlet/fan module prior to module finstallation on engine. The option does exist, however, for rigging to be accomplished on a fully assembled engine. Rigging must be performed whenever CIVV system has been disturbed. The following are examples of conditions which require system rigging:
 - (1) Control and cylinder or linear actuating cylinder has been replaced.
 - (2) CIVV linkage system components have been broken or disconnected.
 - (3) Mechanical parts within CIVV system have been replaced (variable vanes, synchronizing ring, etc.).

2. COMPRESSOR INLET VARIABLE VANE CYLINDER SYSTEM - RIGGING.

(See Figures 1 through 5.)

NOTE

LM 1008 rigging pin will establish $75^{\circ}30'$ to $76^{\circ}30'$ angle between lever arms and synchronizing ring.

- a. Install LM 1008 rigging pin as follows:
 - (1) If necessary, disconnect CIVV linear actuating and CIVV control and cylinder clevises (figure 1, sheet 1) from bell crank assemblies by removing cotter pins, retainers, and clevis pins.
 - (2) Move synchronizing ring and bell crank assemblies manually to check for freedom of movement. There shall be no indication of binding throughout stroke range of the cylinders.

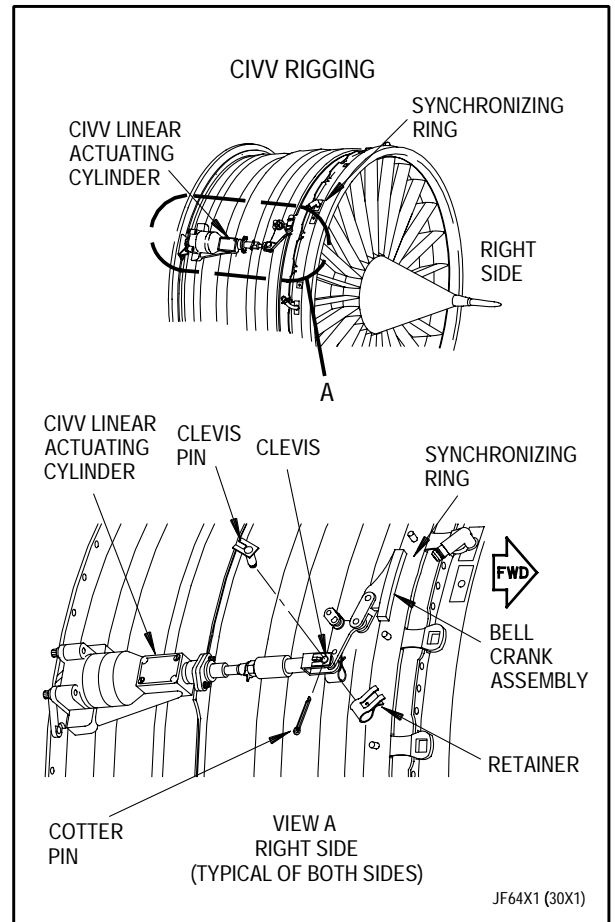


Figure 1. Compressor Inlet Variable Vane System - Rigging Pin Installation (Sheet 1 of 2)

NOTE

Synchronizing ring may be rotated to facilitate installation of LM 1008 rigging pin.

- (3) Align rigging hole in bell crank assemblies with indent on fan case.
- (4) Install LM 1008 rigging pin through hole of bell crank assembly and into indent on fan case.

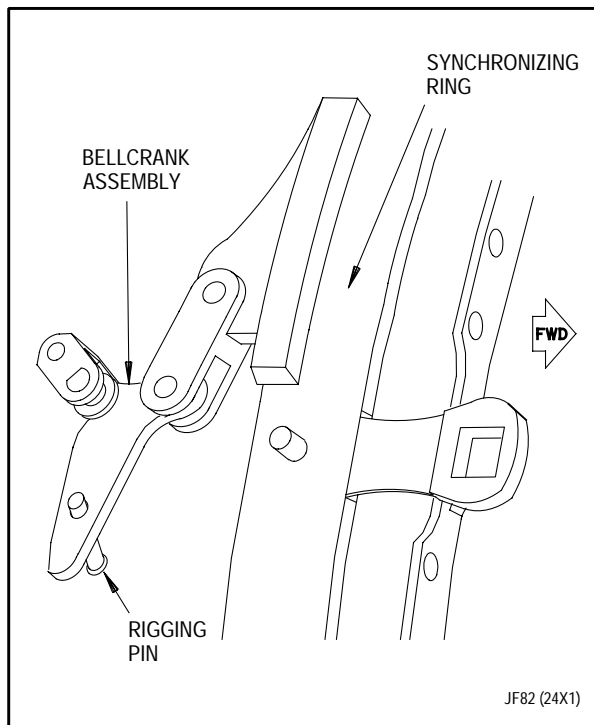


Figure 1. Compressor Inlet Variable Vane System - Rigging Pin Installation (Sheet 2 of 2)

- b. Use LM 1005, LM 1006 and LM 1007 hose assemblies for CIVV actuation.

Figures 2 and 2A deleted.

- c. If necessary, install work adapters onto control and cylinder for CIVV system rigging as follows:

- (1) Lubricate threads of two ST2000-04 adapters and two MS9966-04 packings with MIL-L-7808 engine oil. Install packings on shorter ends of adapters. Install adapters in PFMO and PFEXT ports and tighten.
- (2) Lubricate threads of one ST2000-06 adapters and one MS9966-06 packings with MIL-L-7808 engine oil. Install packings on shorter ends of adapters. Install adapters in PF1 outlet port and tighten.
- (3) Lubricate threads of one ST2091-042 adapter and one MS9966-06 packing with MIL-L-7808 engine oil. Install packing on shorter end of adapter. Install adapter on PFRET port and tighten.
- (4) Lubricate threads of one ST2251-082 adapter and one MS9966-06 packing with MIL-L-7808 engine oil. Install packing on shorter end of adapter. Install adapter in PF2F port and tighten.

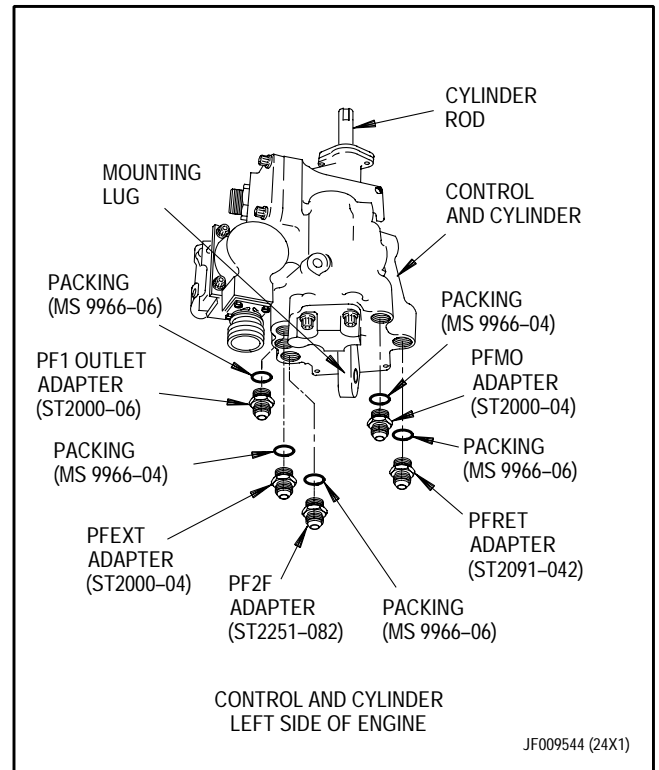


Figure 3. Compressor Inlet Variable Vane System - Installation of Work Adapters (Sheet 1 of 2)

d. If necessary, install work adapters onto linear actuating cylinder for CIVV system rigging as follows:

- (1) Lubricate threads of ST2000-04 adapter and MS9966-04 packing with engine oil. Install packing on shorter end of adapter. Install adapter into PFEXT port and tighten.
- (2) Lubricate threads of ST2091-042 adapter and MS9966-06 packing with engine oil. Install packing on shorter end of adapter. Install adapter into PFRET port and tighten.

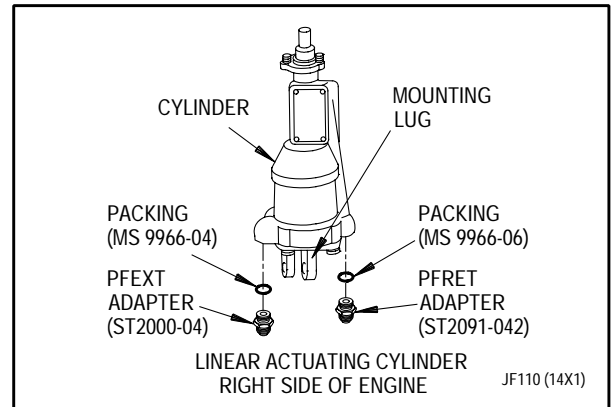


Figure 3. Compressor Inlet Variable Vane System - Installation of Work Adapters (Sheet 2 of 2)

e. Connect PWA 50096 test equipment to linear actuating cylinder and control and cylinder as follows:

- (1) Install caps on PFMO port and PF2F port.
- (2) Connect PWA 514713 retract adapter onto control and cylinder PFRET port.
- (3) Connect LM 1006 five foot hose onto linear actuating cylinder PFRET port and PWA 51473 retract adapter.

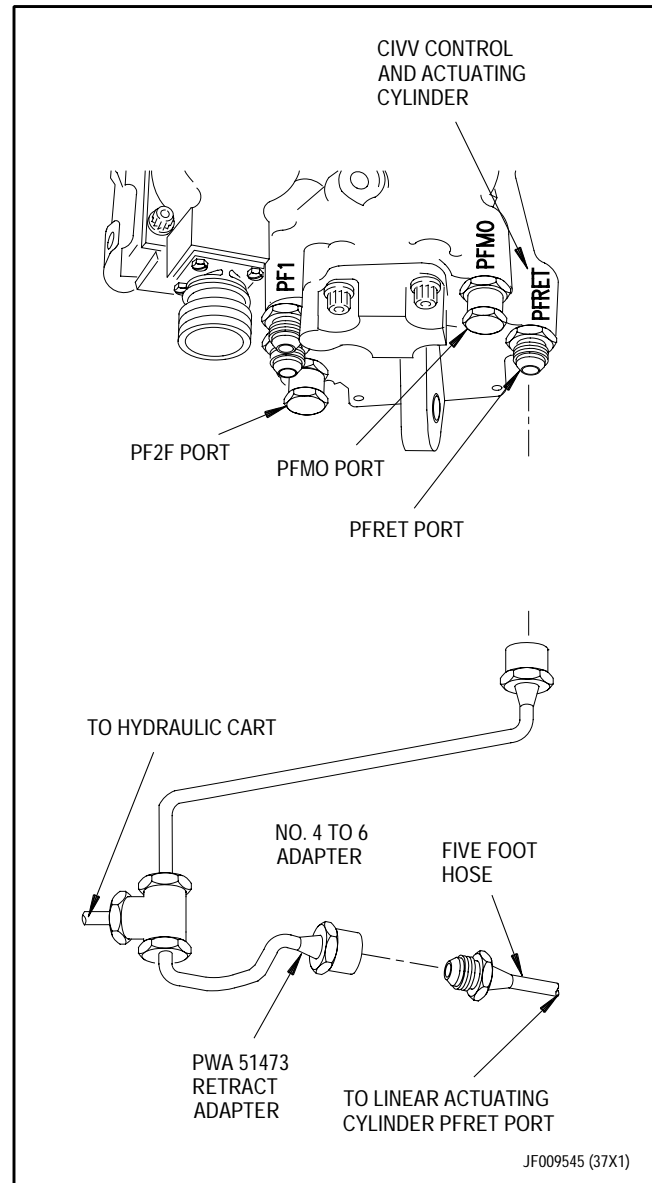


Figure 4. Compressor Inlet Variable Vane System - Tooling Installation (Sheet 1 of 3)

- (4) Install aeroquip No. 4 to 6 adapters or equivalent onto PWA 51472 extend adapter.
- (5) Connect LM 1005 and LM 1007 one foot hoses onto control and cylinder PFEXT port and PWA 51472 extend adapter.
- (6) Connect LM 1006 five foot hose onto linear actuating cylinder PFEXT port and PWA 51472 extend adapter.

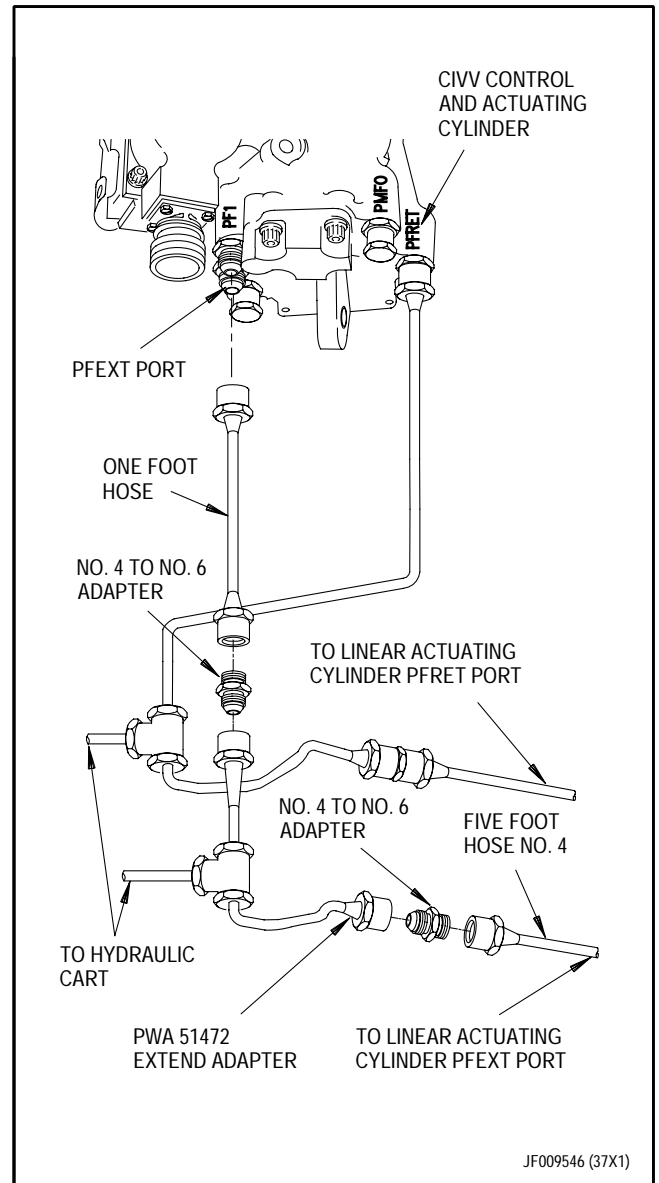


Figure 4. Compressor Inlet Variable Vane System - Tooling Installation (Sheet 2 of 3)

- (7) Connect PWA 51432 return adapter onto control and cylinder PF1 outlet port.

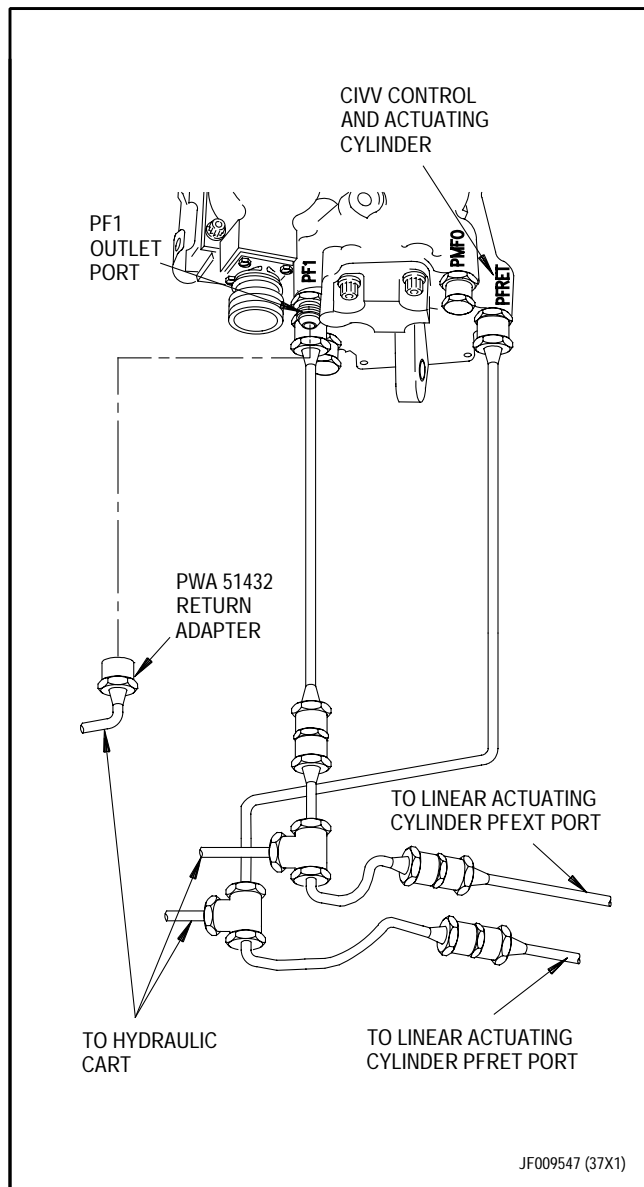


Figure 4. Compressor Inlet Variable Vane System - Tooling Installation (Sheet 3 of 3)



Clevises shall not contact bell crank assemblies. Contact between clevises and bell crank assemblies can result in damage to bell crank assemblies.

NOTE

Operating instructions for PWA 50096 test equipment are found in T.O. 33D4-6-617-1.

f. Perform rigging procedures as follows:

NOTE

- All steps apply to both sides of engine unless otherwise specified.
 - Clevis pin is removed from clevis before starting rigging procedure.
- (1) Align clevises (figure 5, Sheet 1) to clear bell crank assemblies.

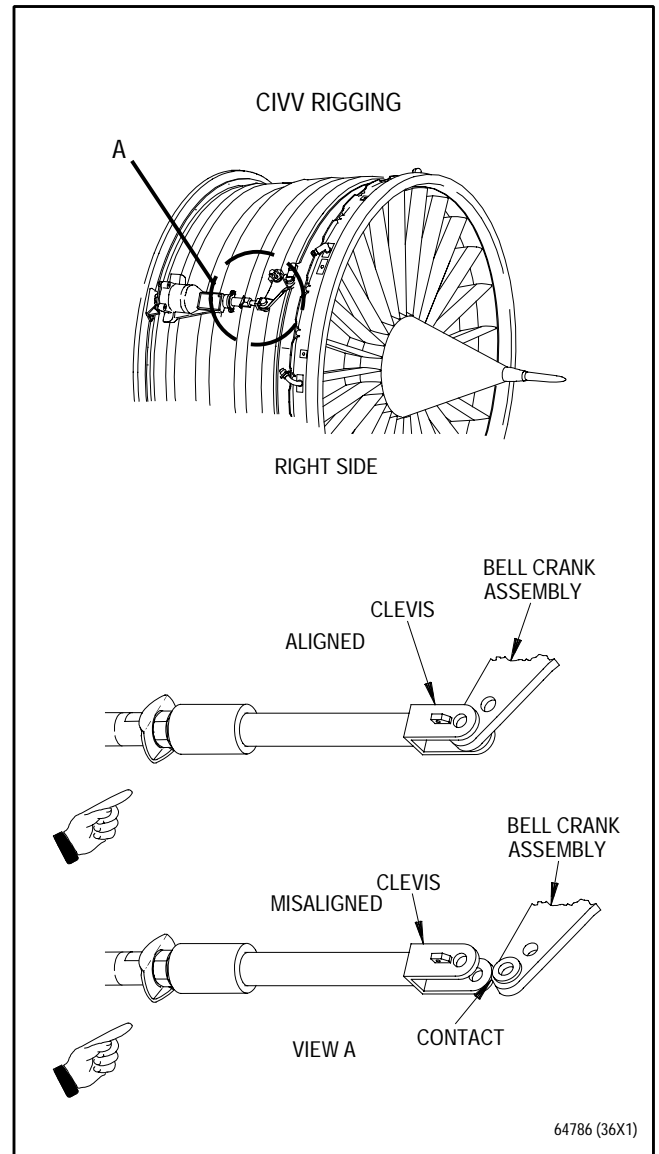


Figure 5. Compressor Inlet Variable Vane System - Rigging (Sheet 1 of 6)

- (2) Turn hydraulic test equipment on and extend cylinder rods using 100 to 250 psig.
- (3) Using LM 1008 rigging pin, check alignment of clevis hole (figure 5, Sheet 2) with hole in bell crank assembly. Pin shall pass freely through clevis and bell crank assembly.
- (4) If either clevis does not align with bell crank assembly, retract cylinder rods and turn off hydraulic test equipment.
- (5) Back off sleeve nut (figure 5, Sheet 3) and adjust clevis as necessary to attain correct alignment.
- (6) First set of threads on clevis shall not extend beyond end of cylinder rod.
- (7) Second set of threads on clevis shall not extend beyond end of sleeve nut.
- (8) Repeat steps (1) through (7) as required until alignment of holes in clevis and bell crank assembly is attained.
- (9) After correct alignment has been attained, shut off hydraulic test equipment.

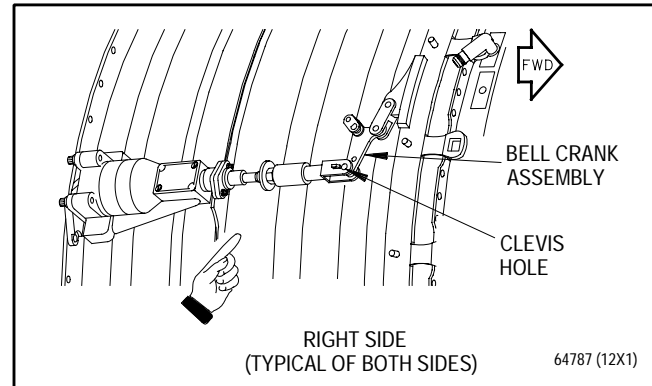


Figure 5. Compressor Inlet Variable Vane System - Rigging (Sheet 2 of 6)

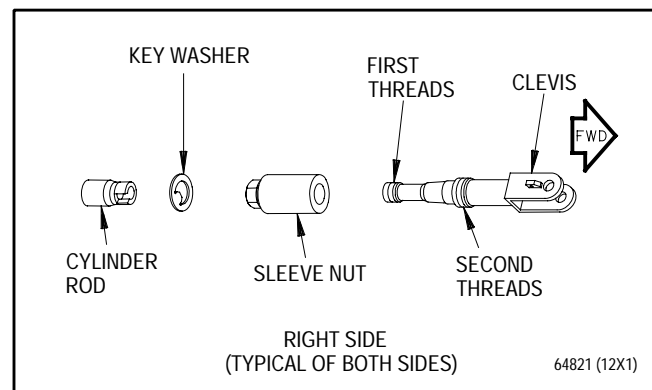


Figure 5. Compressor Inlet Variable Vane System - Rigging (Sheet 3 of 6)

- (10) Install clevis pin (figure 5, Sheet 4), retainer, and cotter pin to secure clevis to bell crank assembly.
- (11) Verify that first set of threads (figure 5, sheet 5) on clevis does not extend beyond end of cylinder rod.
- (12) Verify that second set of threads on clevis does not extend beyond end of sleeve nut.

NOTE

There are two configurations of clevis: V-slot and square slot. Key washer and torque are different for each configuration.

- (13) Torque sleeve nut on V-slot clevis 75 to 85 pound-inches. Torque sleeve nut on square slot clevis 135 to 165 pound-inches.
- (14) Remove LM 1008 rigging pin.
- (15) Turn on hydraulic test equipment and actuate CIVV actuating cylinder three times. Check rigging pin alignment and freedom of movement.
- (16) Turn off hydraulic test equipment.

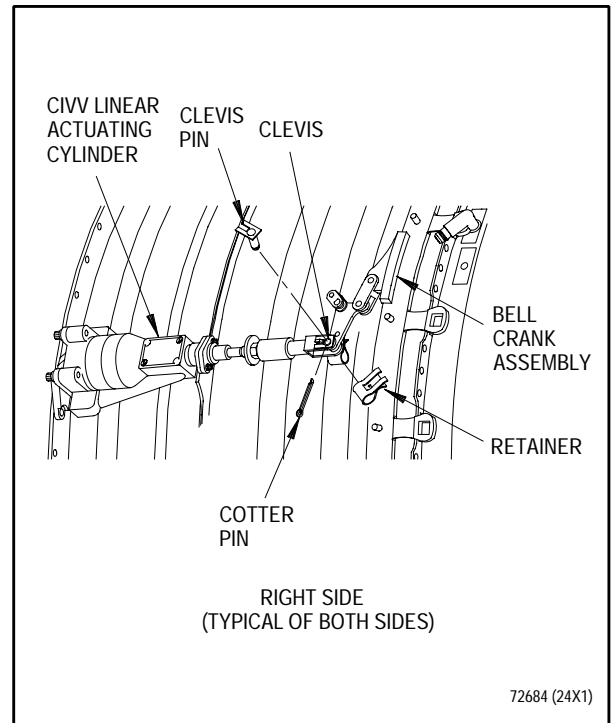


Figure 5. Compressor Inlet Variable Vane System - Rigging (Sheet 4 of 6)

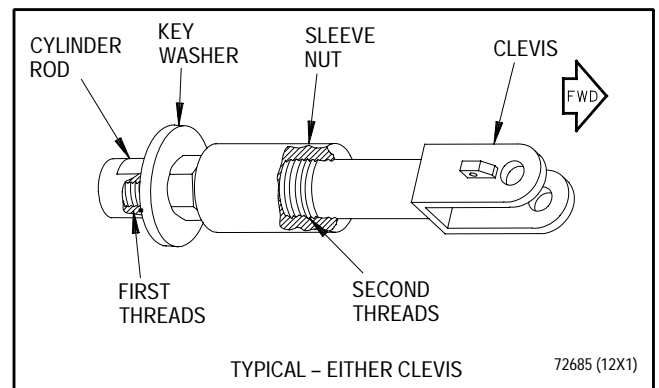


Figure 5. Compressor Inlet Variable Vane System - Rigging (Sheet 5 of 6)

- (17) Secure sleeve nut (figure 5, Sheet 6) by bending key washer against flat of cylinder rod and flat of sleeve nut 180 degrees apart.
- (18) Disconnect hoses and remove hydraulic tube adapters from CIVV control and cylinder.
- (19) Install protective closures as required.

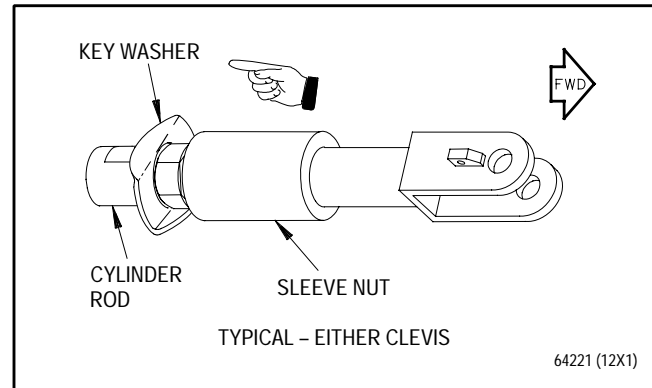


Figure 5. Compressor Inlet Variable Vane System - Rigging (Sheet 6 of 6)

WORK PACKAGE**TECHNICAL PROCEDURES****ROTOR AND STATOR ASSEMBLY, FRONT COMPRESSOR -****DYNAMIC BALANCING****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 30

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	30	8	30	17 - 21	0
2	0	9 - 11	0	22	6
2A Added	30	12	23	23	13
2B Blank Added	30	13	0	24 - 25	0
3 - 4	30	14	23	26	30
5	0	15	0	27	0
6 - 7	23	16	13	28	23

REFERENCE MATERIAL REQUIRED

Title	Number
U.S.A.F. Material Deficiency Reporting and Investigation System -----	T.O. 00-35D-54
Inlet/Fan Module -----	T.O. 2J-F100-53-6
Balance Bearing - Inspection -----	WP 332 00
Table of Limits and Clearance Charts -----	WP 801 00
Front Compressor Rotor and Stator Balance Pulley Assembly (PWA 53645) -----	T.O. 33D4-6-573-1

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

None

CONSUMABLE MATERIALS

Nomenclature	Specification/Vendor Part Number
Oil, lubricating	MIL-L-7808
Cloth, lint free	
Gloves, lint free	

EXPENDABLE ITEMS

Nomenclature	Part Number	Quantity
Counterweight	4014692 CL1 through CL4	AR
Counterweight	4014693 CL1 through CL5	AR
Rivet - tubular	2146417	AR

APPLICABLE SUPPORT EQUIPMENT

Paragraph	Function - Tool Nomenclature	Tool Number
2	FRONT COMPRESSOR ROTOR AND STATOR ASSEMBLY - INSTALLATION OF DYNAMIC BALANCING TOOLS	
	SPACER, FRONT COMPRESSOR FRONT HUB BALANCE - - - - -	PWA 52303
	BEARING, BALANCE AND CONCENTRICITY CHECK - - - - -	PWA 21350-41
	SPACER, FRONT COMPRESSOR FRONT HUB FORWARD BALANCE -	PWA 52858
	NUT, FRONT COMPRESSOR FRONT HUB BALANCE BEARING RETAINER - - - - -	PWA 50385
	DRIFT, NO. 1 BEARING AND SEAL PLATE - - - - -	PWA 50309
	ADAPTER, ASSY/DISASSY, FRONT COMPRESSOR HUB BALANCE BEARING NUT - - - - -	PWA 56687 OR
	WRENCH, HAND, FRONT COMPRESSOR FRONT HUB BALANCE BEARING RETAINING NUT - - - - -	PWA 50386
	FIXTURE, FRONT FAN BALANCE - - - - -	PWA 57700
	RETAINER, INLET/FAN MODULE, HANDLING, REAR - - - - -	PWA 57615
	HOOK - - - - -	PWA 2388
	SLING, FRONT AND REAR COMPRESSOR ROTOR ASSEMBLY - - -	PWA 6580
	ADAPTER, LIFT AND TRUNNION - - - - -	PWA 26147
	SPACER, MODULE SUPPORT STAND - - - - -	PWA 50993
	STAND, INLET/FAN MODULE, STORAGE AND DISASSEMBLY - -	PWA 56338 OR
	STAND, INLET/FAN MODULE, STORAGE AND DISASSEMBLY - -	PWA 50775
	BEARING, BALANCE AND CONCENTRICITY CHECK - - - - -	PWA 21350-42
	DRIFT - - - - -	PWA 57335
	FIXTURE, FRONT COMPRESSOR REAR BALANCE - - - - -	PWA 57699
3	FRONT COMPRESSOR ROTOR AND STATOR ASSEMBLY - TRANSFER TO BALANCING MACHINE	
	HOOK, SAFETY - - - - -	PWA 2388
	SLING, FRONT AND REAR COMPRESSOR ROTOR ASSEMBLY - - -	PWA 6580
	ADAPTER, LIFT AND TRUNNION - - - - -	PWA 26147
	PULLEY, FRONT COMPRESSOR ROTOR AND STATOR BALANCE -	PWA 53645

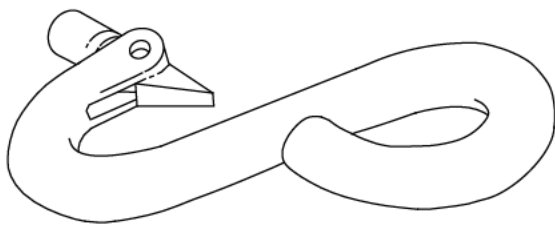
APPLICABLE SUPPORT EQUIPMENT (continued)

Paragraph	Function - Tool Nomenclature	Tool Number
4	FRONT COMPRESSOR ROTOR AND STATOR ASSEMBLY - DYNAMIC BALANCING	
	WEIGHT, SET FRONT COMPRESSOR ROTOR - - - - -	PWA 57544
	PULLEY, FRONT COMPRESSOR ROTOR AND STATOR BALANCE -	PWA 53645
5	FRONT COMPRESSOR ROTOR AND STATOR ASSEMBLY - REMOVAL FROM BALANCING MACHINE	
	PULLEY, FRONT COMPRESSOR ROTOR AND STATOR BALANCE -	PWA 53645
	FIXTURE, FRONT COMPRESSOR REAR BALANCE - - - - -	PWA 57699
	ADAPTER, LIFT AND TRUNNION - - - - -	PWA 26147
	HOOK, SAFETY - - - - -	PWA 2388
	SLING, FRONT AND REAR COMPRESSOR ROTOR ASSEMBLY - - -	PWA 6580
	STAND, INLET/FAN MODULE, STORAGE AND DISASSEMBLY - -	PWA 56338
		OR
	STAND, INLET/FAN MODULE, STORAGE AND DISASSEMBLY - -	PWA 50775
	SPACER, MODULE SUPPORT STAND - - - - -	PWA 50993

APPLICABLE SUPPORT EQUIPMENT (continued)

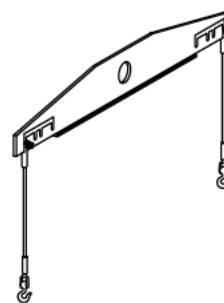
Paragraph	Function - Tool Nomenclature	Tool Number
6	FRONT COMPRESSOR ROTOR AND STATOR ASSEMBLY - REMOVAL OF BALANCING TOOLING AND SECURING OF COUNTERWEIGHTS	
	FIXTURE, FRONT FAN BALANCE - - - - -	PWA 57700
	SPACER, MODULE SUPPORT STAND - - - - -	PWA 50993
	HOOK, SAFETY - - - - -	PWA 2388
	SLING, FRONT AND REAR COMPRESSOR ROTOR ASSEMBLY - - -	PWA 6580
	ADAPTER, LIFT AND TRUNNION - - - - -	PWA 26147
	RIVETER, FRONT COMPRESSOR DISK BALANCE COUNTERWEIGHT, RIVET - - - - -	PWA 50338
	PULLER, BALANCE BEARING, FRONT COMPRESSOR FAN REAR -	PWA 57941
		OR
	PULLER, FRONT COMPRESSOR FRONT AND REAR BALANCE BEARING - - - - -	PWA 57723
	RETAINER, INLET/FAN MODULE, HANDLING REAR - - - - -	PWA 57615
	ADAPTER, ASSEMBLY/DISASSEMBLY, FRONT COMPRESSOR HUB BALANCE BEARING NUT - - - - -	PWA 56687
		OR
	WRENCH, HAND, FRONT COMPRESSOR FRONT HUB BALANCE BEARING RETAINING NUT - - - - -	PWA 50386
	PULLER, FRONT COMPRESSOR FRONT HUB BALANCE BEARING AND SPACER - - - - -	PWA 50393

ILLUSTRATED SUPPORT EQUIPMENT



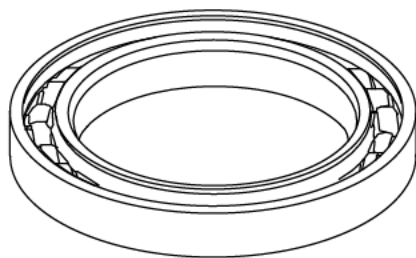
PWA 2388 -C

Figure T1. PWA 2388 Hook



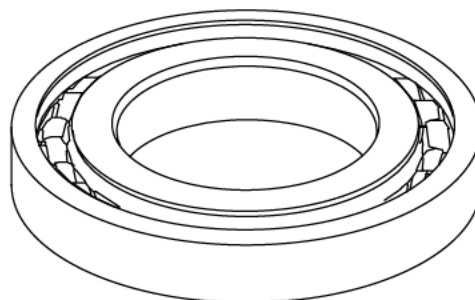
PWA 6580 -C

Figure T2. PWA 6580 Sling



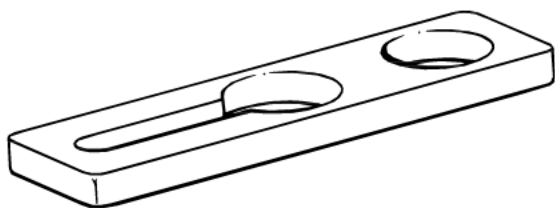
PWA 2135041 -C

Figure T3. PWA 21350-41 Bearing



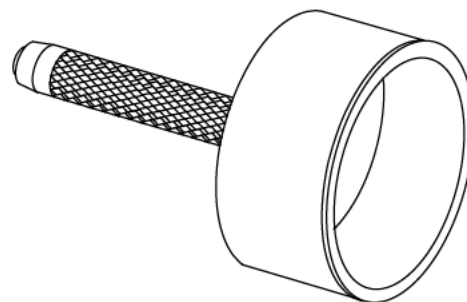
PWA 2135042 -C

Figure T4. PWA 21350-42 Bearing



PWA 26147 -C

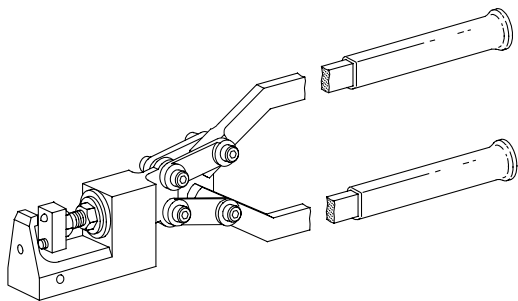
Figure T5. PWA 26147 Adapter



PWA 50309 -C

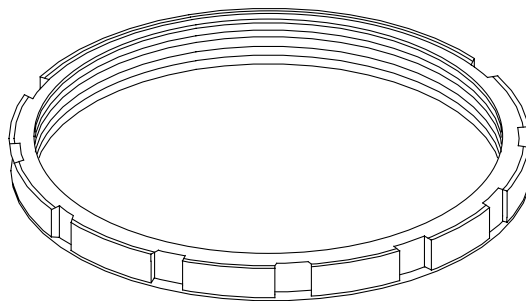
Figure T6. PWA 50309 Drift

ILLUSTRATED SUPPORT EQUIPMENT (continued)



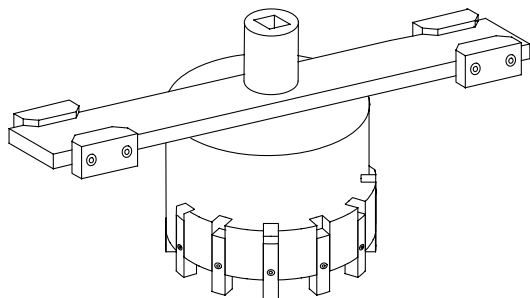
PWA 50338 -C

Figure T7. PWA 50338 RIVETER



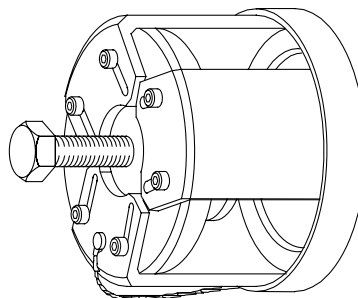
PWA 50385

Figure T8. PWA 50385 NUT



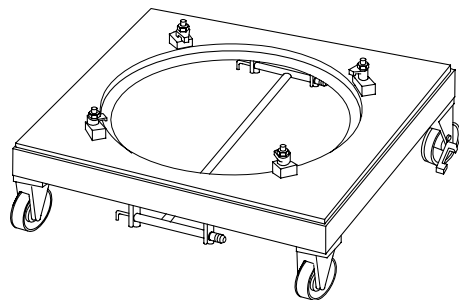
PWA 50386 -C

Figure T9. PWA 50386 WRENCH



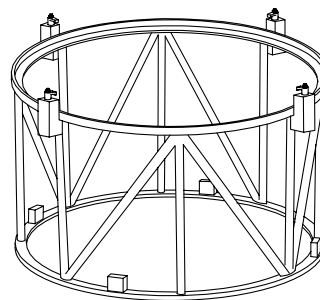
PWA 50393 -C

Figure T10. PWA 50393 PULLER



PWA 50775 -C

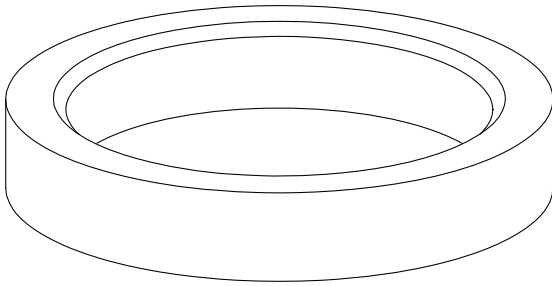
Figure T11. PWA 50775 STAND



PWA 50993 -C

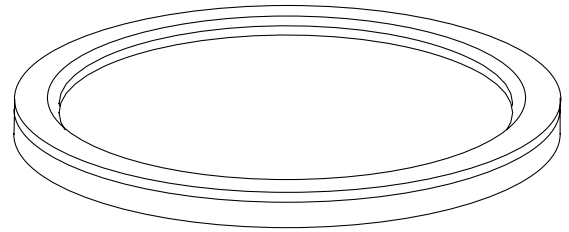
Figure T12. PWA 50993 SPACER

ILLUSTRATED SUPPORT EQUIPMENT (continued)



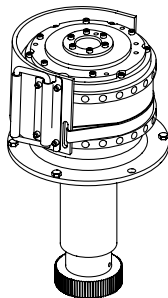
PWA 52303 -C

Figure T13. PWA 52303 SPACER



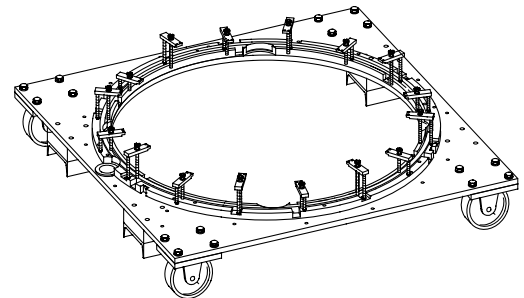
PWA 52858 -C

Figure T14. PWA 52858 SPACER



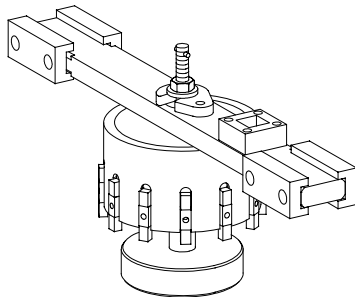
PWA 53645 -C

Figure T15. PWA 53645 PULLEY



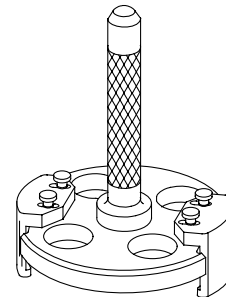
PWA 56338 -C

Figure T16. PWA 56338 STAND



PWA 56687 -C

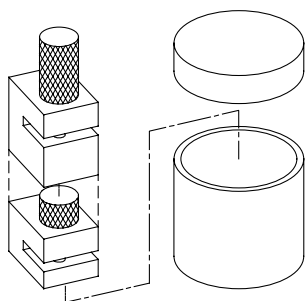
Figure T17. PWA 56687 ADAPTER



PWA 57335 -C

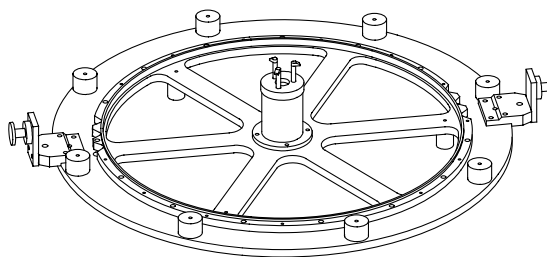
Figure T18. PWA 57335 DRIFT

ILLUSTRATED SUPPORT EQUIPMENT (continued)



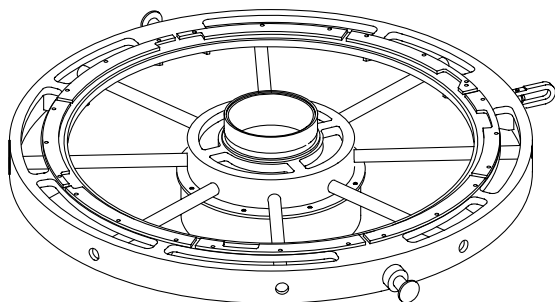
PWA 57544 -C

Figure T19. PWA 57544 WEIGHT



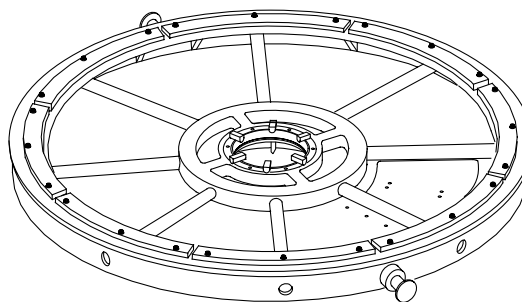
PWA 57615 -C

Figure T20. PWA 57615 RETAINER



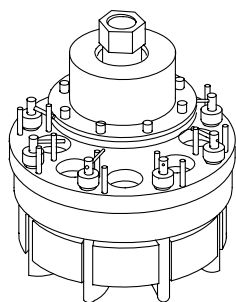
PWA 57699 -C

Figure T21. PWA 57699 FIXTURE



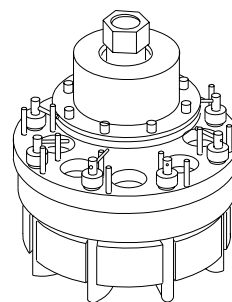
PWA 57700 -C

Figure T22. PWA 57700 FIXTURE



PWA 57723 -C

Figure T23. PWA 57723 PULLER



PWA 57941 -C

Figure T24. PWA 57941 PULLER

1. INTRODUCTION.

- a. This work package contains instructions for dynamic balancing of front compressor rotor and stator assembly.

2. FRONT COMPRESSOR ROTOR AND STATOR ASSEMBLY - INSTALLATION OF DYNAMIC BALANCING TOOLS.

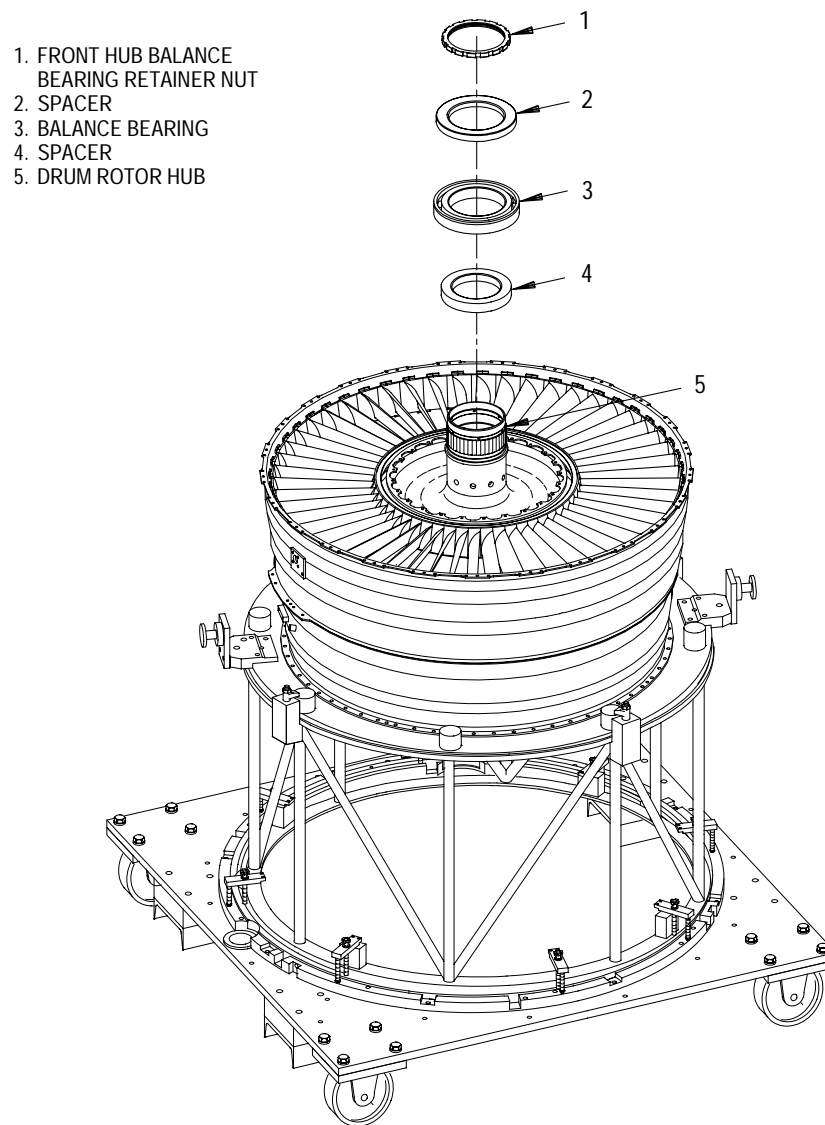
(See Figures 1 through 5.)

- a. The 25 run limit for balance bearings as specified in T.O. 2-1-111, Section 7, is optional for inlet fan module dynamic balance. An alternate method of determining balance bearing acceptability is to monitor the fluctuation of the balance machine meter during final balance. If meter fluctuation exceeds 0.1 ounce-inches, it is recommended that balance bearings be removed for inspection and refurbishment per WP 332 00.



Handle balance bearing with clean, lint free gloves. Handling with bare hands can cause corrosion on bearing.

- b. Install PWA 52303 spacer(4, figure 1), PWA 21350-41 balance bearing(3), PWA 52858 spacer(2) and PWA 50385 bearing retaining nut(1) onto front hubs(5) as follows:
 - (1) Ensure that PWA 21350-41 balance bearing has been inspected and accepted for use and is free of foreign material. Refer to WP 332 00.
 - (2) Place PWA 52858 front spacer(2), PWA 52303 rear spacer(4), and PWA 21350-41 front balance bearing(3), in hot oil tank for a minimum of ten minutes.
 - (3) Wipe drum rotor hub(5) with cloth to remove foreign material.
 - (4) Apply light coat of engine oil onto drum rotor hub. Wipe off excess.



JF134 (44X2)

Figure 1. Front Compressor Rotor and Stator Assembly - Installation of Dynamic Balancing Tools

- (5) Remove PWA 52303 spacer(4) from hot oil tank and install onto drum rotor hub.
- (6) Remove PWA 21350-41 balance bearing(3) from hot oil tank and install onto drum rotor hub(5).
- (7) Remove PWA 52858 spacer(2) from hot oil tank and install onto drum rotor hub(5) bevel side out.
- (8) Using PWA 50309 drift, seat PWA 52858 spacer, PWA 21350-41 balance bearing, and PWA 52303 spacer.
- (9) Install PWA 50385 bearing retaining nut(1), bevel side toward spacer, onto hub.

NOTE

PWA 56687 adapter or PWA 50386 wrench may be used to torque bearing retaining nut.

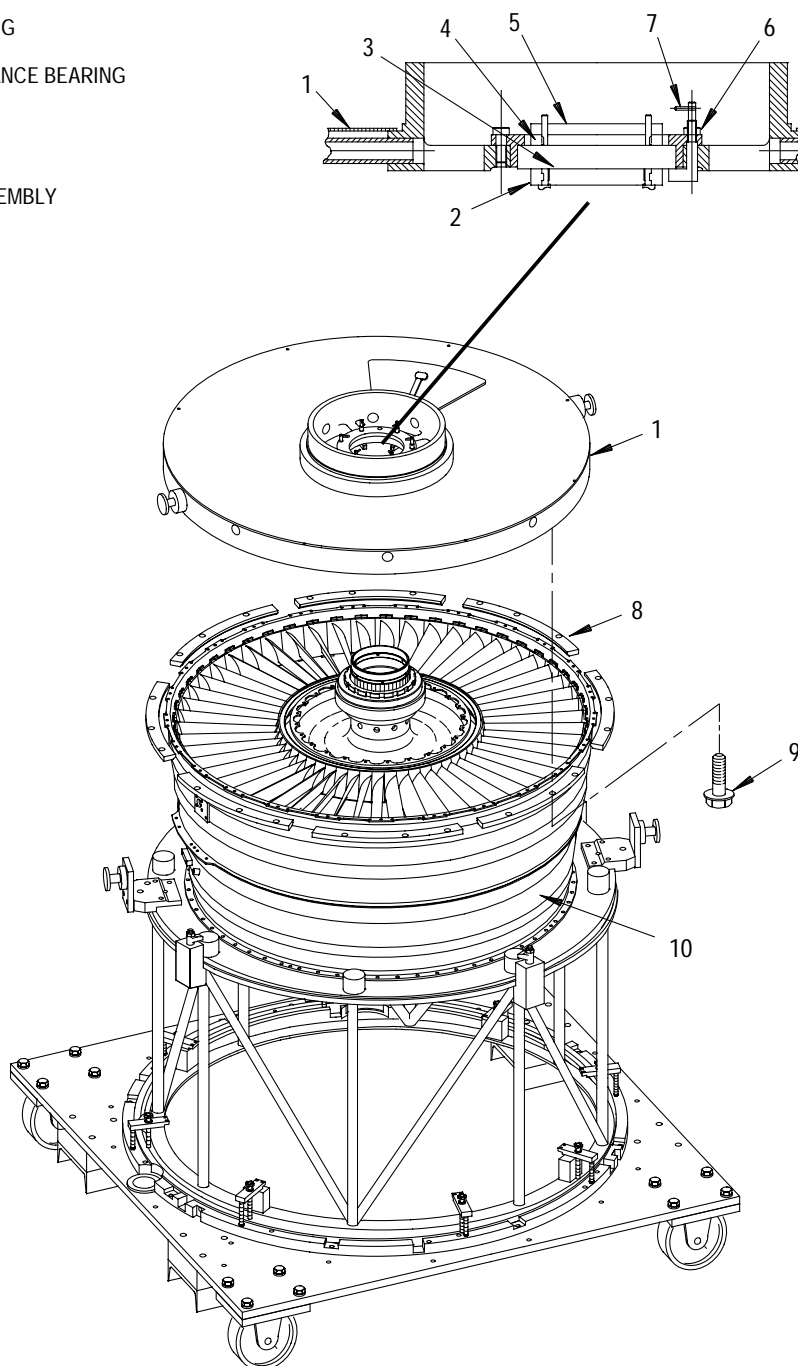
- (10) Using PWA 56687 adapter, torque bearing retaining nut as follows:
 - (a) Loosen hex nut, rotate swing C washer from under hex nut, and separate threaded plug assembly from main wrench adapter.
 - (b) Screw threaded plug and shaft assembly into fan hub.

- (c) Position wrench adapter over shaft engaging adapter teeth into bearing retaining nut and rotate by hand to snug retaining nut against bearing spacer.
- (d) Rotate Swing C washer under hex nut and tighten hex nut.
- (e) Position torque wrench into square drive of adapter 90 degrees perpendicular to center line of adapter handles. Torque bearing retaining nut 1500 to 2000 pound-inches. After assembly has cooled to room temperature, repeat torque.

- (f) Remove tooling.

- (10a) Using PWA 50386 wrench, torque bearing retaining nut 1500 to 2000 pound inches. After assembly has cooled down to room temperature, repeat torque.
- (11) Ensure that spacers and bearing are seated by attempting to insert 0.001 inch feeler stock between mating surfaces of hub, spacers, and bearing.

1. FRONT FAN BALANCE FIXTURE
2. SPACER
3. BALANCE BEARING
4. SPACER
5. FRONT HUB BALANCE BEARING
6. RETAINER NUT
7. HOOK CLAMP
8. RING SEGMENT
9. CAP SCREW ASSEMBLY
10. FAN CASE



JF135X1 (51X2)

Figure 2. Front Compressor Rotor and Stator Assembly - Installation of Dynamic Balancing Tools

c. Install PWA 57700 front balance fixture(1, figure 2) onto assembly as follows:

- (1) Remove cap screws(9) securing eight PWA 57700 detail-2 ring segments(8) to body of fixture.
- (2) Loosen hex nuts(6) securing six PWA 57700 detail-10 hook clamps(7). Turn hook clamps so that dowel pin on end of clamp points outward. Tighten hex nut finger tight to secure.
- (3) Position dowel pin in PWA 57700 front balancing fixture at 6 o'clock position, 180 degrees opposite dowel pin in PWA 57615 rear retainer.
- (4) Using hoist, PWA 2388 safety hook, PWA 6580 sling, and PWA 26147 trunnion adapters, position PWA 57700 front balancing fixture(1) over PWA 21350-41 balance bearing(3) and fan case(10). Align trunnions on PWA 57700 front balancing fixture with trunnions on PWA 57615 rear retainer.
- (5) Position beveled edge of PWA 57700 front balancing fixture detail-2 ring segments facing upward and toward fan case flange.

(6) Install PWA 57700 front balancing fixture detail-2 ring segment(8) at PWA 57700 front balancing fixture dowel pin location. Secure ring segment with cap screws(9) fingertight. Continue installing ring segments in sequence. After all ring segments have been installed, torque cap screws 60 to 70 pound-inches.

(7) Loosen PWA 57700 detail-11 hex nuts(6) securing six PWA 57700 detail-10 hook clamps(7). Turn hook clamps so that dowel pins on end of leg points inward, indicating engagement of clamp with outer race of bearing(3).

(8) Unlock locking legs on inner detail of PWA 57615 rear retainer.

(9) Torque hex nuts(6) 175 to 200 pound-inches while maintaining inward position of dowel pin.

d. Release PWA 57615 retainer(4) from PWA 50993 spacer(5) and lift rotor assembly from spacer(5) and stand(6); then install two PWA 26147 trunnion adapters(3) on lifting spools of rear retainer(4) and using another hoist, PWA 2388 safety hook(2) and PWA 6580 sling(1) turn rotor assembly to front end down.

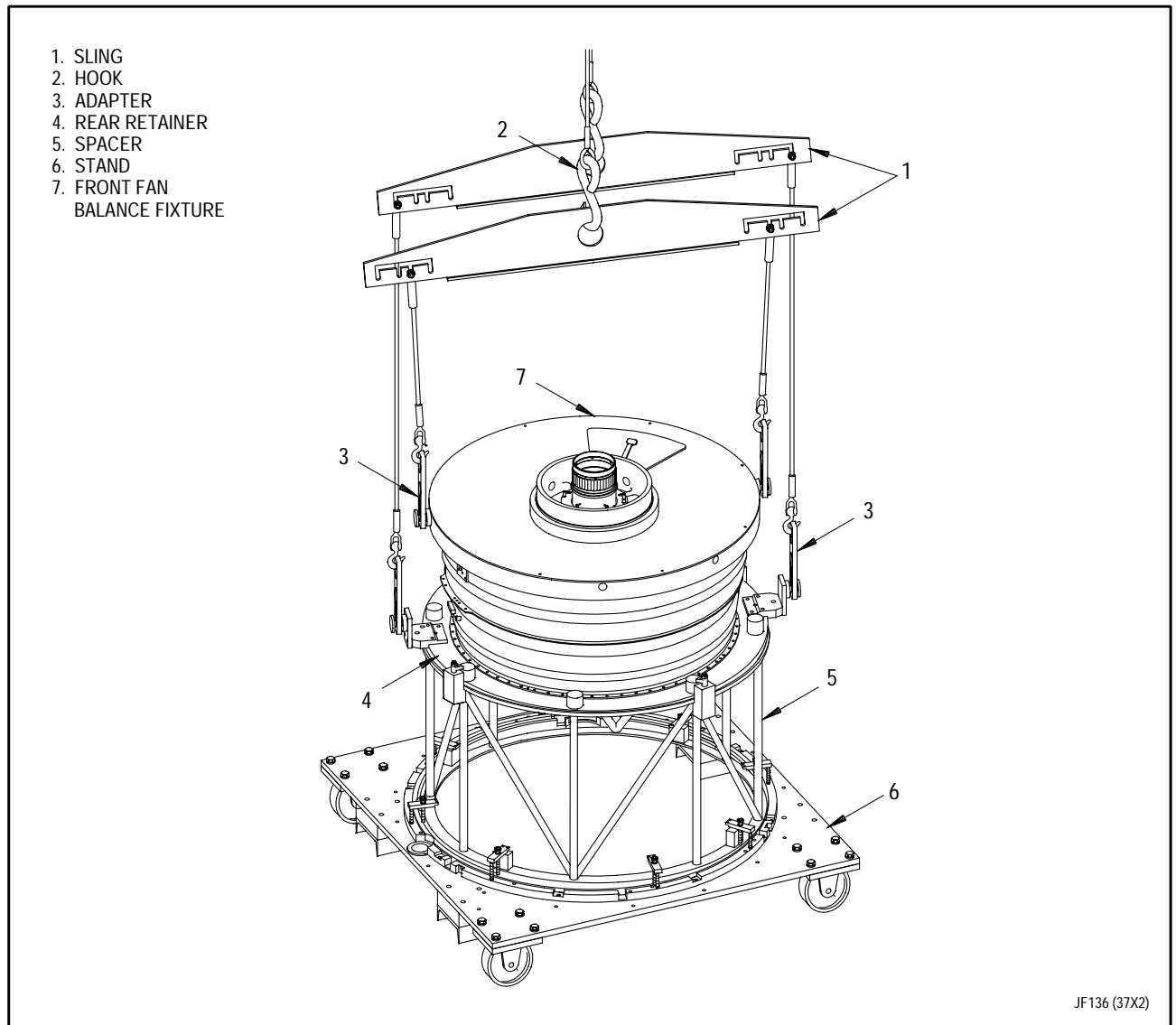


Figure 3. Front Compressor Rotor and Stator Assembly - Installation of Dynamic Balancing Tools

NOTE

Flat side of PWA 56338 detail locating ring faces up for PWA 50993 spacer installation.

- e. Lower rotor and stator assembly onto PWA 50993 spacer(6, figure 4) and PWA 56338 stand(7). Secure PWA 57700 front balance fixture(5) to spacer(6).
- f. Remove PWA 57615 retainer from rotor assembly using trunnions, adapters and sling.
- g. PWA 21350-42 rear balance bearings shall be inspected every six months per WP 332 00. Repeated installation and removal actions may cause wear on the ID surface of the bearing inner race. Wear in this area can affect fit tightness and concentricity of the inner race. The balancing machine will not detect concentricity increase in the balance bearing.

The 25 run limit for balance bearings as specified in T.O. 2-1-111, section 7, paragraph 93 is considered optional for this bearing.

- h. Install PWA 21350-42 balance bearing(2) onto rear hub(8) as follows:
 - (1) Place PWA 21350-42 balance bearing into hot oil tank for at least ten minutes.
 - (2) Apply light coat of engine oil onto drum rotor hub(8). Wipe off excess.
 - (3) Remove PWA 21350-42 balance bearing(2) from hot oil tank and insert bearing into channel of PWA 57335 drift. Loosen screws on PWA 57335 detail-2 clamps. Slide clamps over bearing and secure bearing to drift by tightening screws.

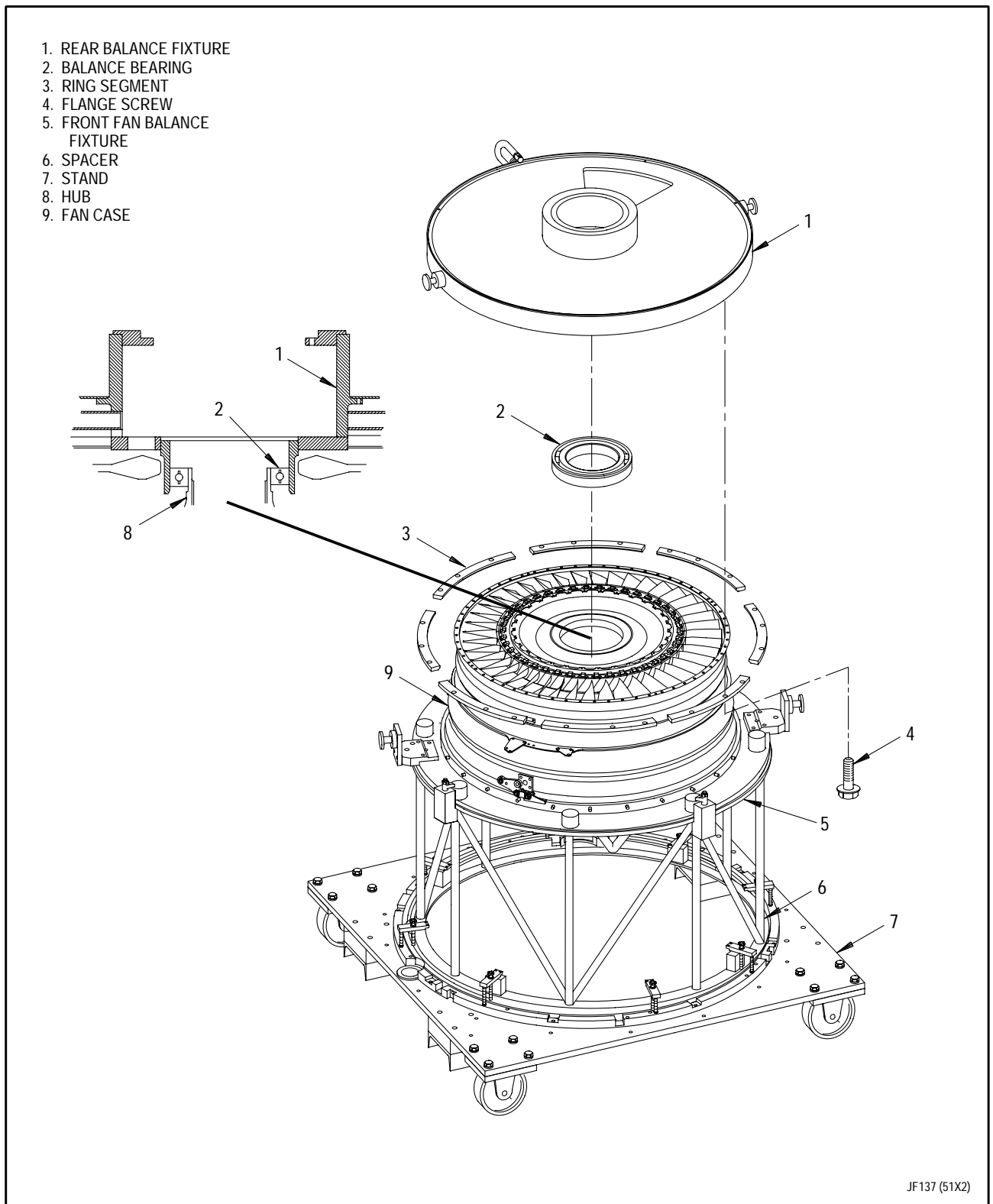


Figure 4. Front Compressor Rotor and Stator Assembly - Installation of Dynamic Balancing Tools

- (4) Install PWA 21350-42 bearing and PWA 57335 drift onto hub(8), with thumb screw side of drift up.
- (5) Seat bearing until drift contacts end of hub. If necessary, lightly tap drift with mallet to position bearing.
- (6) After bearing has cooled to room temperature, loosen thumb screws and slide detail-2 clamps outward. Remove drift.

i. Install PWA 57699 front compressor balancing rear fixture(1) as follows:

- (1) Remove PWA 57699 detail-1 ring segments(3) from PWA 57699 rear fixture(1).
- (2) Using hoist, PWA 2388 safety hook, PWA 56336 sling, and PWA 26147 adapters, lift PWA 57699 rear fixture and position it over drum rotor hub(8) assembly and fan case(9).

- (3) Position doors in PWA 57700 front fixture and PWA 57699 rear fixture on same side.
- (4) Position dowel pin of PWA 57699 rear fixture and dowel pin of PWA 57700 front fixture at 6 o'clock position.
- (5) Slowly lower PWA 57699 rear fixture and align trunnions on rear fixture with trunnions on PWA 57700 front fixture. Tap to seat.

NOTE

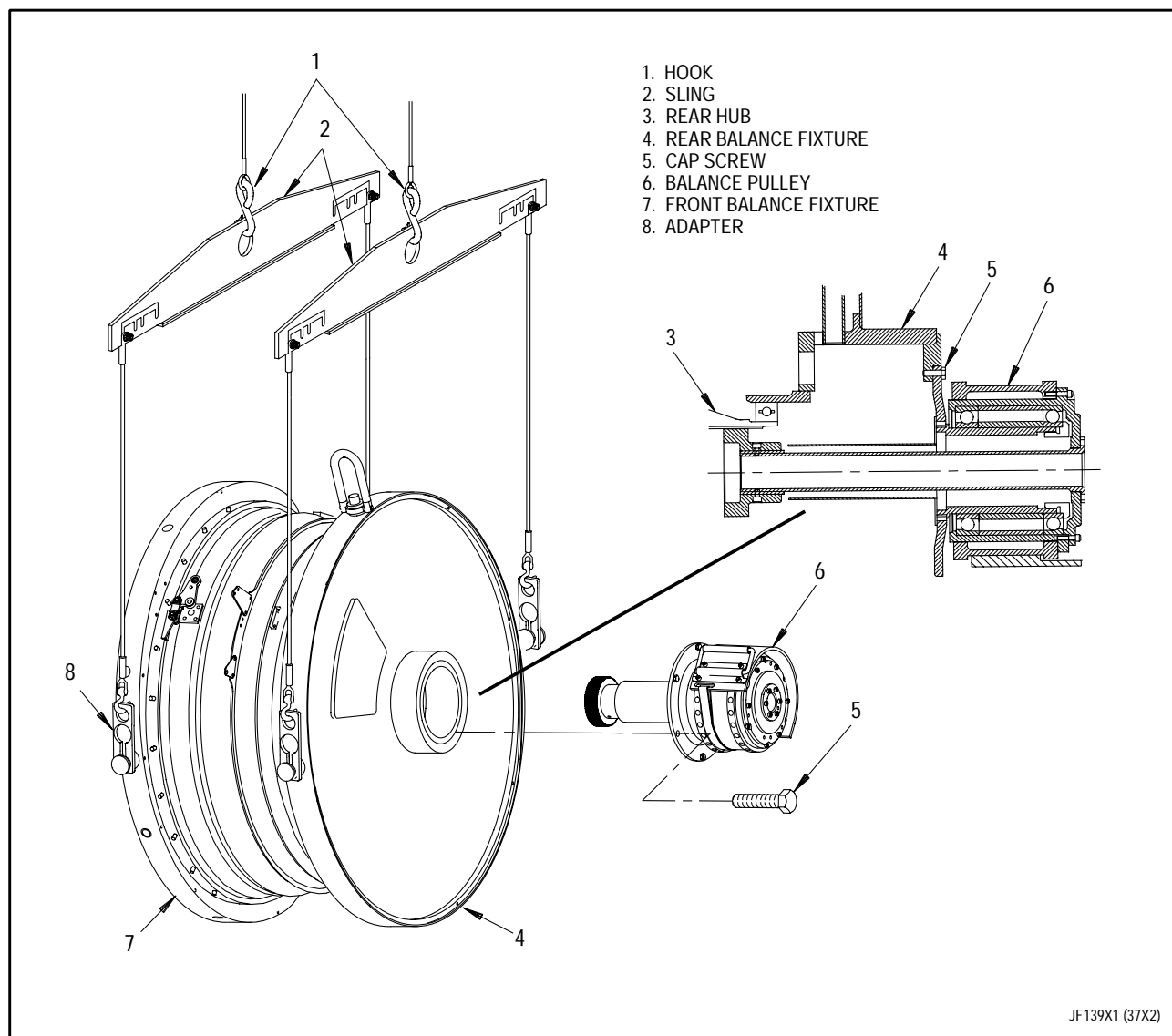
Beveled side of PWA 57699 detail-1 ring segments shall face inward and toward fan case flange.

- (6) Install detail-1 ring segment at dowel pin location. Secure segment with cap screws fingertight. Continue installing segments in sequence. Torque cap screws 50 to 70 pound-inches.

3. FRONT COMPRESSOR ROTOR AND STATOR ASSEMBLY - TRANSFER TO BALANCING MACHINE.

(See Figure 5.)

- a. Install PWA 2388 safety hook(1), PWA 6580 sling(2) PWA 26147 trunnion adapters(8), and hoist on PWA 57699 rear balance fixture(4).
- b. Release PWA 57700 front fixture(7) from PWA 50993 spacer and lift rotor and stator assembly.
- c. Attach hoist, PWA 2388 safety hook(1), PWA 6580 sling(2), and PWA 26147 trunnion adapters(8) to PWA 57700 front fixture(7). Rotate rotor and stator assembly into horizontal position.
- d. Lower rotor and stator assembly into balance machine with rear of assembly at drive end of balance machine. Manually check rotor and stator assembly for freedom of rotation.
- e. Verify that PWA 53645 pulley(6) balance has been checked.
- f. Install PWA 53645 pulley(6) into PWA 57699 rear balance fixture(4) as follows:
 - (1) Install PWA 53645 detail-17 retainer onto PWA 53645 pulley.
 - (2) Using two technicians, install splined end of PWA 53645 pulley directly into drum rotor rear hub(3).
 - (3) Secure PWA 53645 pulley to PWA 57699 rear balance fixture(4) with cap screws(5). Torque cap screws 135 to 150 pound-inches.
- g. Install drive belt onto PWA 53645 pulley and install reflective tape.



**Figure 5. Front Compressor Rotor and Stator Assembly -
Transfer to Balance Machine and Installation of Balance Pulley**

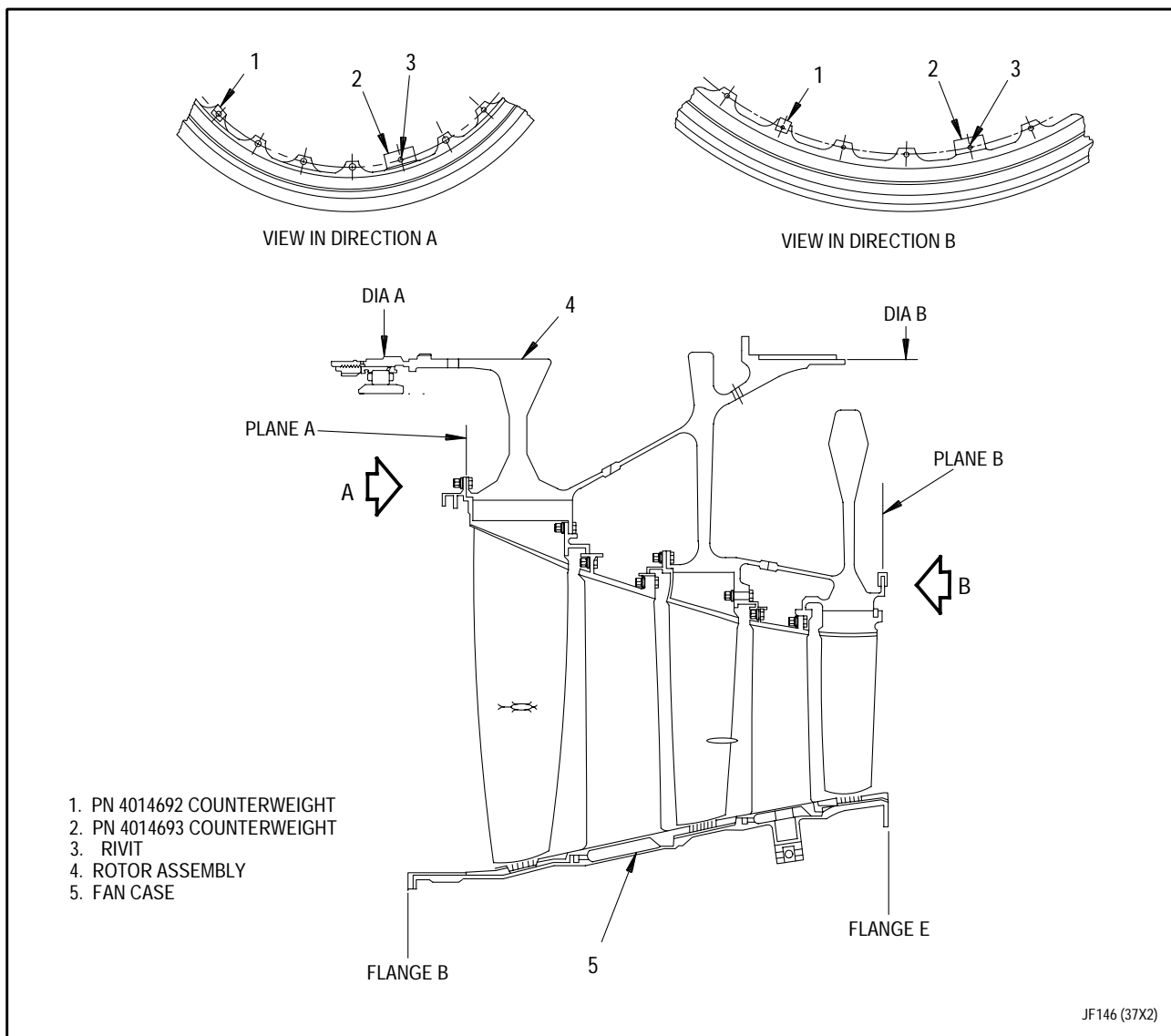


Figure 6. Front Compressor Rotor and Stator Assembly - Dynamic Balancing Machine

4. FRONT COMPRESSOR ROTOR AND STATOR ASSEMBLY - DYNAMIC BALANCING.

(See Figure 6.)

- a. Balance rotor and stator assembly using standard balancing procedures and instructions supplied by machine manufacturer. This paragraph is intended to supply balancing limits.
- b. Initial unbalance requirements are as follows:
 - (1) Rotational speed is to be 1300 rpm minimum.
 - (2) Initial dynamic unbalance in Planes A and B shall not exceed 6.0 ounce-inches per plane.
 - (3) If rotor and stator assembly is within limits, continue with balancing procedure.
- c. Final acceptable residual unbalance limits are as follows:
 - (1) Rotational speed is to be 1300 rpm minimum.
 - (2) Final acceptable unbalance in Planes A and B shall not exceed 0.20 ounce-inch per plane.
 - (3) Secure counterweight and rivet to hub. Using small piece of tape. Rivets will be flared when balance is completed.
 - (4) Correct unbalance to within limits as follows:
 - (a) On counterweight mounting flange of front hub, Plane A, correct unbalance by adding parts PN 4014693 or 4014692

with PN 2146417 in any combination in Plane A at three holes maximum in plane within plus or minus 60 degrees of unbalance vector and a maximum of two parts PN 4014692 class one through four with PN 2146417 per plane at any angular location.

- (b) On counterweight mounting flange of rear hub, Plane B, correct unbalance by adding parts PN 4014693 or 4014692 with PN 2146417 in any combination in Plane B at three holes maximum in plane within plus or minus 60 degrees of unbalance vector and a maximum of two parts PN 4014692 class one through four with PN 2146417 per plane at any angular location.
- d. Verify proper balancing at Plane A as follows:
 - (1) Install PWA 57544 detail-2 front compressor front calibration weight on front hub as close to heavy angle as possible. Calibration weight pulls 4.0 ounce-inches at 1300 rpm.
 - (2) Dynamic balance rotor and stator assembly. Machine should indicate amount of calibration weight plus residual unbalance of part at heavy angle.
 - (3) Remove PWA 57544 detail-2 front calibration weight.

- e. Verify proper balancing at Plane B as follows:

(1) Install PWA 57544 detail-3 front compressor rear calibration weight on rear hub as close to heavy angle as possible. Calibration weight pulls 4.0 ounce-inches at 1300 rpm.

(2) Dynamic balance rotor and stator assembly, machine should indicate amount of calibration weight plus residual unbalance of part at heavy angle.

(3) Remove PWA 57544 detail-3 rear calibration weight.

- f. Ensure tape holding rivets to counterweights is secured properly. Temporarily mark location of counterweights and rivets on front and rear hubs. Rivets will be flared after PWA 57700 front and PWA 57699 rear balance fixtures are removed.

- g. Check unbalance of PWA 53645 pulley as follows:

(1) After dynamic balance of fan module remove pulley and rotate fan 180 degrees.

(2) Install pulley.

(3) Check unbalance. Total unbalance of fan and pulley shall not exceed 1.0 ounce-inch. When this limit is exceeded, repair or recalibrate pulley. Refer to T.O. 33D4-6-573-1.

NOTE

Use nilling compensation of balance machine to automatically account for unbalance of pulley, if total unbalance is under 1.0 ounce-inch.

(4) Pulley shall be recalibrated after disassembly or repair. Refer to T.O. 33D4-6-573-1.

5. FRONT COMPRESSOR ROTOR AND STATOR ASSEMBLY - REMOVAL FROM BALANCING MACHINE.

(See figures 5 and 6.)

- a. Remove drive belt of machine from pulley mounted on hub. Remove reflective tape.
- b. Remove cap screws securing PWA 53645 pulley to PWA 57699 rear balance fixture. Remove PWA 53645 pulley using PWA 53645 detail-17 retainer.
- c. Install four PWA 26147 trunnion adapters to lifting spools on front and rear balance fixtures.
- d. Use two hoists, two PWA 2388 safety hooks, and two PWA 6580 slings to lift rotor and stator assembly from balance machine.

NOTE

Flat side of PWA 56338 detail locating ring faces up for PWA 50993 spacer installation.

- e. Turn assembly to front down position and lower it onto PWA 50993 spacer mounted on PWA 56338 stand.
- f. Secure front fixture to spacer and remove slings and hoists.

6. FRONT COMPRESSOR ROTOR AND STATOR ASSEMBLY - REMOVAL OF BALANCING TOOLING AND SECURING OF COUNTERWEIGHTS.

(See figures 1 through 8.)

- a. Remove bolts securing PWA 57699 rear balance fixture detail-1 ring segments.



Ensure that PWA 57700 front fixture is secured to PWA 50993 spacer to prevent damage to rotor and stator assembly during removal of PWA 57699 rear fixture. PWA 57699 rear fixture may bind to rear balance bearing during removal.

- b. Remove PWA 57699 rear fixture using overhead hoist, PWA 2388 safety hook, PWA 6580 sling, and PWA 26147 trunnion adapters. Install PWA 57699 rear fixture detail-1 ring segments back on rear fixture before storage.
- c. Remove tape securing counterweights and rivets to flange.

- d. Check rivet movement as follows:

- (1) Apply pressure to counterweight, toward disk flange, with one hand move rivet in and out with the other hand. Rivet shall move freely.

- (2) If any interference is detected replace counterweight using same part number and class. Repeat step e.(1). Damaged counterweight shall be submitted on a Material Deficiency Report in accordance with T.O. 00-35D-54.

- e. Before flaring rivet be sure manufactured head of rivet is on inside of flange. Using PWA 50338 riveter, flare rivets 0.156 to 0.180 inch diameter.
- f. Counterweight shall move freely on disk counterweight flange.
- g. Apply pressure with hand at center of counterweight, toward disk flange, and inspect gap between counterweight and disk counterweight flange. Counterweight shall rest flat against disk counterweight flange. Counterweight shall not rock on rivet. See figure 7.

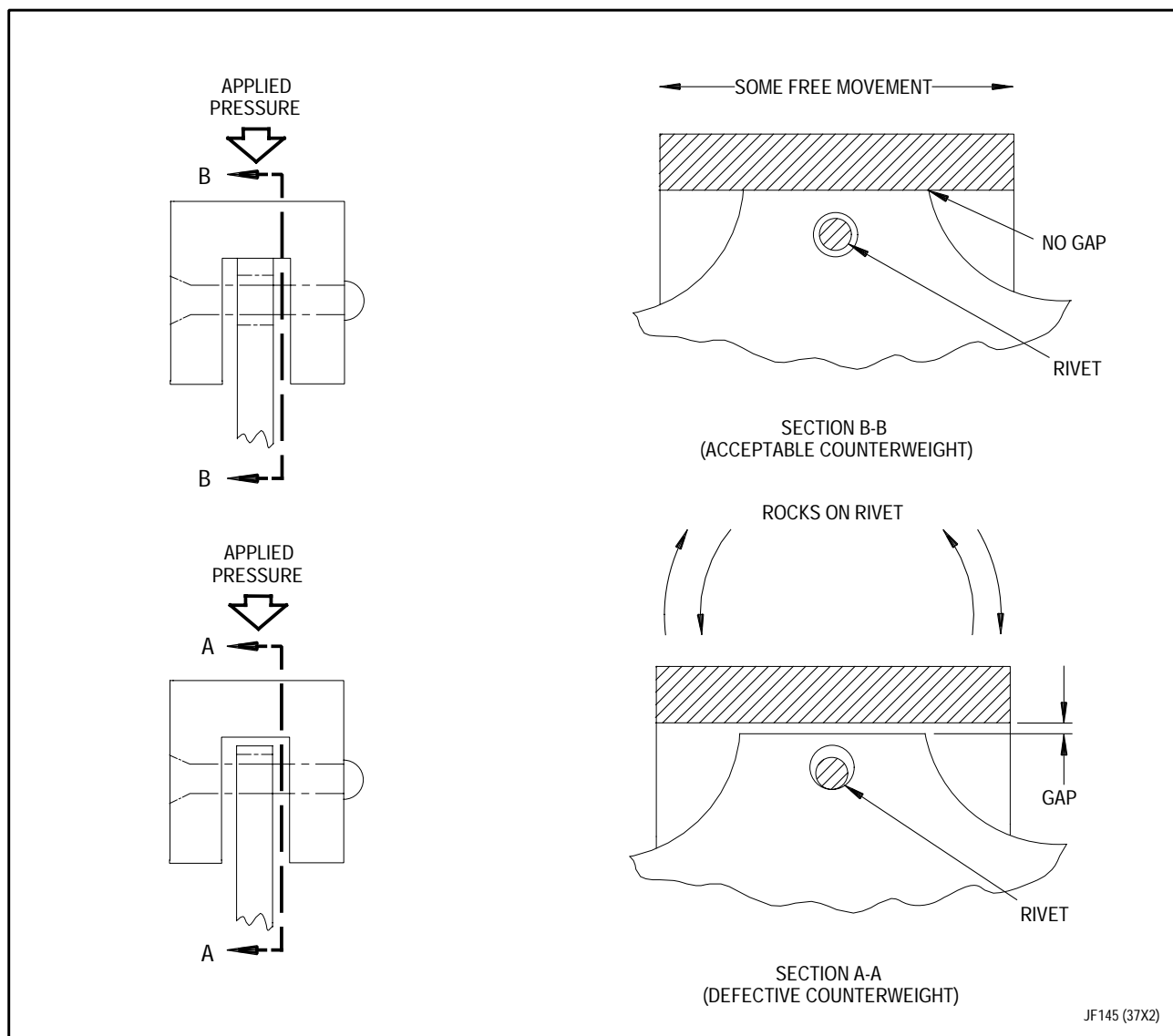
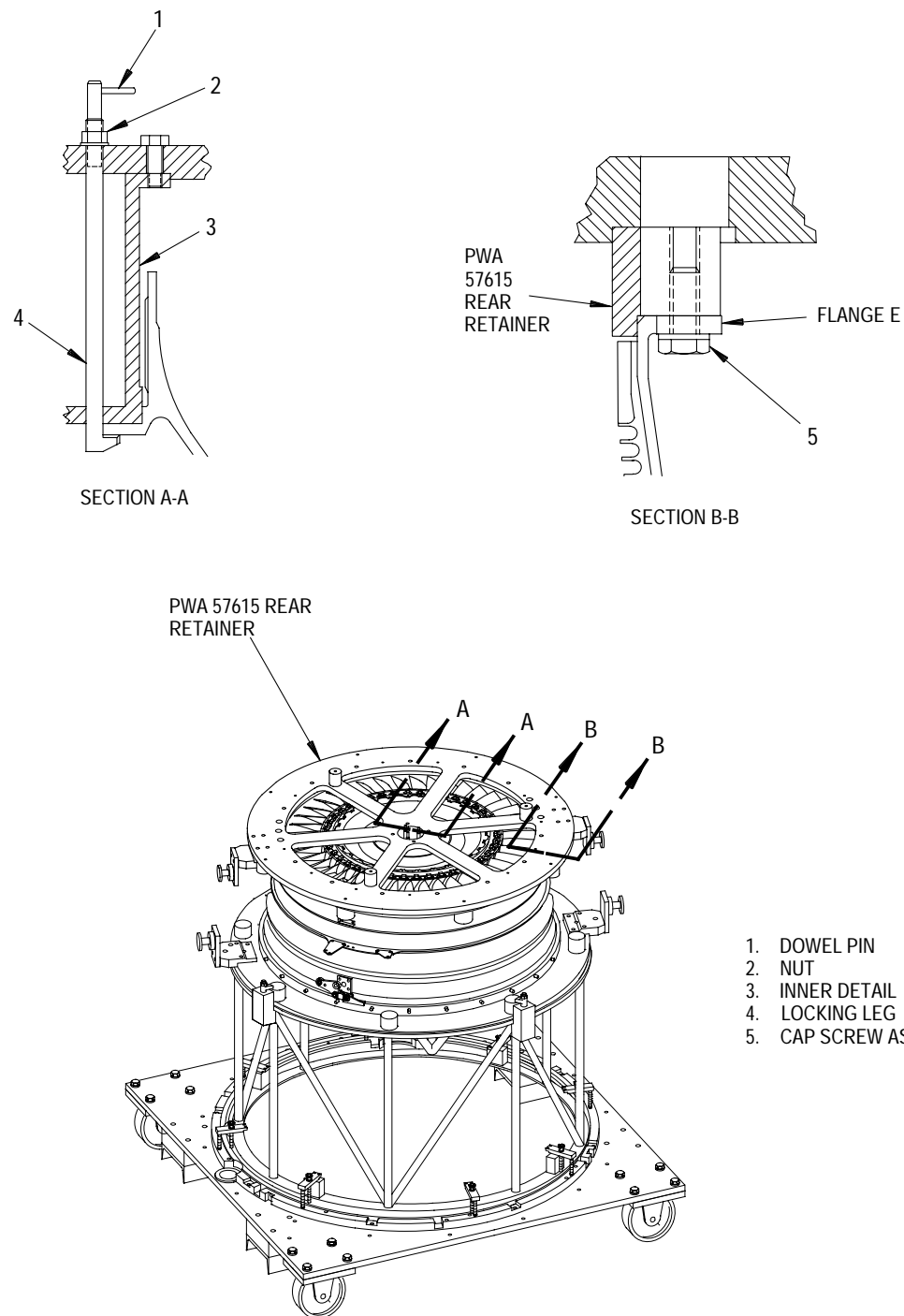


Figure 7. Counterweight Movement and Gap - Inspection

- h. Remove PWA 21350-42 rear balance bearing as follows:
 - (1) Install PWA 57941 puller onto rear bearing and engage jaw assemblies. Ensure that dowel pins face inward.
 - (2) While one technician holds drum rotor assembly, turn center actuator of PWA 57941 puller counterclockwise and remove rear balance bearing from hub.
 - (3) Turn locking legs of PWA 57941 puller outward and remove bearing. Store bearing in its container immediately.
- i. Install synchronizing ring over fan case with lever arms facing down.
- j. Install PWA 57615 rear retainer onto rear of drum rotor and fan case as follows:
 - (1) Turn locking legs(4, figure 8) of inner detail(3) inward to prevent interference with drum rotor assembly. Using overhead hoist, PWA 6580 sling, PWA 2388 safety hook, and PWA 26147 adapters, lower PWA 57615 rear retainer onto module. Align dowel pin(1) on rear retainer with dowel pin hole at 12 o'clock location on fan case.
 - (2) Turn locking legs(4) of inner detail outward to secure PWA 57615 rear retainer to drum rotor assembly and tighten nuts(2).
 - (3) Secure PWA 57615 rear retainer to fan case with cap screws(5).
- k. Release module from PWA 50993 spacer. Carefully raise module. Attach PWA 2388 safety hook, PWA 6580 sling, and PWA 26147 trunnion adapters to PWA 57700 front balancing fixture. Rotate module to front end up position and carefully lower module back onto PWA 50993 spacer. Secure PWA 57615 rear retainer to PWA 50993 spacer by positioning clamps of PWA 50993 spacer onto feet of PWA 57615 rear retainer and tightening nuts.
- l. Remove bolts securing PWA 57700 front balancing fixture detail-2 ring segments. Turn PWA 57700 front balancing fixture detail-10 hook clamps outward to release PWA 21350-41 balance bearing.
- m. Carefully remove PWA 57700 front balancing fixture. Install detail-2 ring segments back onto fixture before storage.
- n. Remove tape securing counterweights and rivets to flange.



JF141 (51X2)

Figure 8. Front Compressor Rotor and Stator Assembly - Installation of PWA 57615 Rear Retainer

o. Check rivet movement as follows:

(1) Apply pressure to counterweight, toward disk flange, with one hand and move rivet in and out with the other hand. Rivet shall move freely.

(2) If any interference is detected replace counterweight using same part number and class. Repeat step e.(1). Damaged counterweight shall be submitted on a Material Deficiency Report in accordance with T.O. 00-35D-54.

p. Before flaring rivet be sure manufactured head of rivet is on inside of flange. Using PWA 50338 riveter, flare rivets 0.156 to 0.180 inch diameter.

q. Counterweight shall move freely on disk counterweight flange.

r. Apply pressure with hand at center of counterweight, toward disk flange, and inspect gap between counterweight and disk counterweight flange. Counterweight shall rest flat against disk counterweight flange. Counterweight shall not rock on rivet. See figure 8.

NOTE

PWA 56687 adapter or PWA 50386 wrench may be used to remove bearing retaining nut.

s. Using PWA 56687 adapter, remove bearing retaining nut as follows:

(1) Loosen hex nut, rotate swing C washer from under hex nut, and separate threaded plug assembly from main wrench adapter.

(2) Screw threaded plug and shaft assembly into fan hub.

(3) Position wrench adapter over shaft and engage adapter teeth into retaining nut.

(4) Rotate swing C washer under hex nut and tighten hex nut finger tight.



Failure to loosen adapter swing C washer retention hex nut after bearing retaining nut initial torque is overcome may overload and damage fan hub internal threads.

(5) Release retaining nut initial torque using large plastic or rubber mallet, or 1/2 inch drive breaker bar.

(6) Loosen swing C washer retaining hex nut several turns and rotate the wrench adapter by hand to remove bearing retaining nut.

(7) Remove tooling.

sl. Using PWA 50386 wrench, remove bearing retaining nut by striking wrench striker plate with large rubber or plastic mallet.

t. Remove PWA 21350-41 front balance bearing and spacer using PWA 50393 puller as follows:

(1) Position jaws behind spacer and secure with lockring detail.

(2) Use jackscrew action to remove spacer and balance bearing.



Handle balance bearing with clean, lint free gloves. Handling bearings with bare hands can cause rust on bearings.

(3) Store balance bearing in its container immediately.

WORK PACKAGE

INTRODUCTION

INLET/FAN MODULE -

TABLE OF LIMITS

EFFECTIVITY: ENGINE MODEL F100-PW-229

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 2

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1 - 2					0

1. INTRODUCTION.

- a. This work package introduces the 800 00 through 899 00 series work packages for the Inlet/Fan module. This series provides Table of Limits. The following work packages are included in this series:

WP No.

Title

801 00

Inlet/Fan Module - Table of Limits

WORK PACKAGE**TECHNICAL PROCEDURES****INLET/FAN MODULE -****TABLE OF LIMITS****EFFECTIVITY: ENGINE MODEL F100-PW-229****LIST OF EFFECTIVE WP PAGES**

Total Number of Pages in this WP is 22

PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.	PAGE NO.	CHANGE NO.
1	22	9 - 10	11	17	0
2	21	11	19	18 Blank	0
3 - 4	0	12	22	19	12
5	14	13 - 14	11	20 Blank	0
6 - 7	11	15	0	21	20
8	20	16	16	22 Blank	0

REFERENCE MATERIAL REQUIRED

Title	Number
Standard Maintenance Procedures - - - - -	T.O. 2-1-111

APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS

T.O. No.	Date	Level	Title (ECP No.)
T.O. 2J-F100229(I)-515	15 Oct 96	O/I	Retrofit of PN 4081566 First Stage Fan Shroud Featuring a Tighter Fit, F100-PW-229 Engine, F15/F-16 Aircraft (ECP 93QA034)
T.O. 2J-F100229(I)-516	30 Nov 96	O/I	Replacement of PN 4075565 and PN 4075566 Compressor Inlet Variable Vane (CIVV) Actuator Rod Clevises, F100-PW-229 Engines, F-15 Aircraft (ECP 95QA027)

CONSUMABLE MATERIALS

None

EXPENDABLE ITEMS

None

APPLICABLE SUPPORT EQUIPMENT

None

ILLUSTRATED SUPPORT EQUIPMENT

None

1. INTRODUCTION.

- a. This work package contains dimensional limits and torque values for inlet/fan module.

2. GENERAL INSTRUCTIONS.

(See FO-1 and Tables 1 through 4.)

- a. The inlet/fan module dimensional limits and torque values are contained in four tables: table 1 consists of fits and clearances between mating modular parts which require control; table 2 lists blade tip radial clearances; table 3 provides instructions for all special torque procedures while table 4 incorporates spring loads.
- b. Each entry has a reference number which corresponds to a similar number on FO-1 - Inlet/Fan Module Dimensional Limits and Torque Values. The illustration is used for part identification and to indicate where in the module the referenced limit, or torque value applies. For a more detailed explanation of reference numbers, limits, terms, symbols, units, and standard torques refer to T.O. 2-1-111.

3. LIMITS.

- a. Limits without a single asterisk (*) or double asterisk (**) appearing in the limits column have a Replace If Over tolerance added to either the Minimum or Maximum limit or both.
- b. Limits with a single asterisk (*) appearing in the limits column have no Replace If Over tolerance assigned.
- c. Limits with a double asterisk (**) appearing in either the Minimum or Maximum limits column or both have been assigned a Replace If Over clearance limit identical to the respective blueprint clearance limit.

4. TERMS AND SYMBOLS.

- a. Symbol T in Minimum and Maximum in Tables of Limits column indicates tight fit.
- b. Unless otherwise specified, all fits are diametrical, except spline fits which are calculated from chordal dimensions.
- c. Letter-number codes enclosed within a circle on limits charts, such as A12, are of contractor significance only and shall be ignored.

- d. Letter-number codes within parentheses, such as (C-8), relate to coordinates on the outer margins of each clearance chart to facilitate location.

5. UNITS.

- a. Figures in Minimum and Maximum columns in Tables of Limits shall be interpreted as follows: Torque in pound-inches, spring pressure in pounds, and all other limits in inches.

**Table 1. Fits and Clearances
(See FO-1.)**

Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
2451	Compressor Inlet Case				
	Asyo - - - - -	35.702	35.708		
	Compressor Case Asyo - - - - -	35.714	32.722	.006*	.020*
2452	1st Stage Compressor				
	Air Seal (PN 4075235) - - - - -	35.722	35.726		
	Compressor Case Asyo - - - - -	35.714	35.722	.000*	.012T*
2452	1st Stage Compressor				
	Air Seal (PN 4081566) - - - - -	35.728	35.732		
	Compressor Case Asyo - - - - -	35.714	35.722	.006T*	.018T*
2453	1st Stage Compressor				
	Air Seal (PN 4075235) - - - - -	34.710	34.714		
	Compressor Case Asyo - - - - -	34.702	34.710	.002	.012T*
2453	1st Stage Compressor				
	Air Seal (PN 4081566) - - - - -	34.716	34.720		
	Compressor Case Asyo - - - - -	34.702	34.710	.006T*	.018T*
2455	2nd Stage Compressor				
	Air Seal - - - - -	32.770	32.774		
	Compressor Case Asyo - - - - -	32.762	32.770	.000*	.012T*
2457	3rd Stage Compressor				
	Air Seal - - - - -	31.896	31.900		
	Compressor Case Asyo - - - - -	31.892	31.896	.000*	.008T*
2458	1st Stage Front Compressor				
	Air Seal - - - - -	14.503	14.505		
	1st Stage Compressor				
	Disk & Hub - - - - -	14.517	14.521	.012T*	.018T*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
2459	2nd Stage Front Compressor Air Seal - - - - -	18.459	18.461		
	2nd Stage Compressor Disk & Hub - - - - -	18.445	18.452	.007T*	.016T*
2460	1st stage rear compressor Air Seal - - - - -	16.864	16.866		
	2nd stage compressor Disk and Hub - - - - -	16.876	16.880	.010T*	.016T*
2461	Side Clearance 2nd Stage Compressor Rotor Blade - - -			.007*	.023*
2462	1st Stage Rear Compressor Air Seal - - - - -	17.079	17.082		
	1st Stage Compressor Stator -	17.096	17.104	.014*	.025*
2463	1st Stage Front Compressor Air Seal - - - - -	15.779	15.782		
	1st Stage Compressor Stator -	15.796	15.804	.014*	.027
2464	Clearance Variable Vane Cylinder Support - - - - -	7.278	7.292		
	Compressor Case - - - - -	7.301	7.321	.009*	.043*
2465	Shoulder Bolt - - - - -	.3085	.3095		
	Variable Vane Cylinder Support - - - - -	.3120	.3130	.0025*	.0045*
2466	Flanged Sleeve Bushing - - - - -	.4386	.4391		
	Variable Vane Cylinder Support - - - - -	.4375	.4382	.0004T*	.0016T*
2467	Inlet Front Compressor Air Seal - - - - -	12.5850	12.5880		
	Inlet Front Compressor Stator Shroud - - - - -	12.6175	12.6225	.0295*	.0375*
2468	Inlet Front Compressor Air Seal - - - - -	12.4710	12.4740		
	Inlet Front Compressor Stator Shroud - - - - -	12.4975	12.5025	.0235*	.0315*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
2469	No. 1 Bearing Face Seal Asyo -	4.710	4.714		
	No. 1 Bearing Seal Support --	4.734	4.736	.020*	.026*
2470	1st Stage Compressor Disk and Hub -----	11.983	11.987		
	Inlet Front Compressor Air Seal -----	11.980	11.982	.001T*	.007T*
2471	Side Clearance: 1st Stage Compressor Rotor Blade ----			.002*	.019*
2472	Self Aligning Plain Bearing --	.6245	.6250		
	Bell Crank Front Compressor Stator Linkage Inlet ----	.6248	.6253	.0002T*	.0008*
2473	Self Aligning Plain Bearing --	.6245	.6250		
	Ring Synchronizing Front Compressor Stator Inlet ---	.6248	.6253	.0002T*	.0008*
2474	No. 1 Bearing -----	5.8777	5.8781		
	No. 1 Bearing Housing -----	5.8781	5.8791	.0000*	.0014*
2475	Headless Straight Pin -----	.188	.189		
	No. 1 Bearing Face Seal ----	.202	.204	.013*	.016*
2476	Front Compressor Drum Rotor --	3.9415	3.9424		
	No. 1 Bearing -----	3.9367	3.9370	.0045T*	.0057T*
2477	Side Clearance: Compressor stator lock -----	.125	.130		
	Compressor case -----	.131	.139	.001*	.014*
2478	Front Compressor Drum Rotor --	3.9465	3.9473		
	Seat No. 1 Bearing Seal ----	3.9441	3.9458	.0007T*	.0032T*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
2479	Gap Lock Circumference - - - - -	104.054	104.104		
	Fan Case Circumference - - - - -	104.138	104.169	.034*	.115*
2480	Gap Lock Circumference - - - - -	110.144	110.193		
	Fan Case Circumference - - - - -	110.232	110.264	.039*	.120*
2481	Compressor Stator Cylinder				
	Bolt - - - - -	.2460	.2490		
	Variable Vane Cylinder Support	.2495	.2515	.0005*	.0055*
2482	Side Clearance: Variable Vane				
	Linear Actuating Cylinder - -	.495	.500		
	Variable Vane Cylinder Support	.501	.506	.001*	.011*
2483	Self Aligning Plain Bearing - -	.6245	.6250		
	Bell Crank Front Compressor				
	Stator Linkage Inlet - - - - -	.6248	.6253	.0002T*	.0008*
2484	2nd Stage Front Compressor Air				
	Seal with Barrel Shape - - - -	19.511	19.522		
	2nd Stage Compressor Stator - -	19.536	19.544	.014*	.033*
2484	2nd Stage Front Compressor Air				
	Seal with Wedge Shape - - - - -	19.385	19.421		
	2nd Stage Compressor Stator - -	19.536	19.544	.115*	.159*
2485	3rd Stage Compressor Disk - - -	19.720	19.732		
	2nd Stage Compressor Stator				
	Rear ID Seal - - - - -	19.746	19.754	.014*	.034*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
2486	Compressor Stator Cylinder Bolt	.2460	.2490		
	Linear Variable Vane Actuating				
	Cylinder - - - - -	.2495	.2500	.0005*	.0040*
2487	Machine Bolt - - - - -	.2460	.2490		
	Compressor Cylinder Support Link				
		.2495	.2515	.0005*	.0055*
2488	Compressor Inlet Case - - - - -	35.722	35.726		
	Compressor Case - - - - -	35.718	35.722	.000*	.008T*
2489	Machine Bolt - - - - -	.2460	.2490		
	Variable Vane Control Cylinder -	.2490	.2500	.0000*	.0040*
2490	Machine Bolt - - - - -	.1860	.1890		
	Control Cylinder Support Link -	.1895	.1915	.0005*	.0055*
2491	Machine Bolt - - - - -	.1860	.1890		
	Compressor Case Bracket - - - - -	.1895	.1900	.0005*	.0040*
2492	Compressor Stator Shroud Bushing				
		.755	.757		
	Inlet Front Compressor Stator				
	Shroud - - - - -	.759	.765	.002*	.010*
2493	Gap: No. 1 Bearing Seal Support				
	and Seal Gap at 4.734 basic				
	Diameter - - - - -	.055	.075		
	Housing - - - - -	4.734	4.736	.052*	.081*
2494	No. 1 Bearing Housing - - - - -	8.782	8.784		
	Compressor Inlet Case - - - - -	8.779	8.783	.001*	.005T*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
2495	Side Clearance: Metal Seal Ring - - - - -	.169	.170		
	No. 1 Bearing Face Seal - - - -	.171	.173	.001*	.004*
2496	Side Clearance: Variable Vane Control Cylinder - - - - -	.495	.500		
	Variable Vane Cylinder Support	.501	.506	.001*	.011*
2497	Machine Bolt - - - - -	.2460	.2490		
	Variable Vane Cylinder Support	.2495	.2515	.0005*	.0055*
2498	Machine Bolt Variable Vane - -	.2460	.2490		
	Control Cylinder - - - - -	.2490	.2500	.0000*	.0040*
2499	Compressor Stator Shroud Bushings - - - - -	.744	.746		
	Inlet Front Compressor Stator Shroud - - - - -	.748	.754	.002*	.010*
2500	Front Compressor Stator Inlet Vane - - - - -	.3690	.3700		
	Compressor Stator Shroud Bushings - - - - -	.3710	.3725	.0010*	.0035*
2501	Threaded Pin - - - - -	.1890	.1895		
	Inlet Compressor Stator Front Synchronizing Ring Bearing -	.1895	.1900	.000*	.001*
2502	Threaded Pin - - - - -	.1890	.1895		
	Washer - - - - -	.1910	.1950	.0015*	.0060*
2503	Inlet Stator Compressor Bearing - - - - -	.5615	.5630		
	Inlet Compressor Case(PN 4073197) - - - - -	.5600	.5610	.0005T*	.0030T*
2503	Inlet Stator Compressor Bearing - - - - -	.562	.563		
	Inlet Compressor Case (PN 4080260) - - - - -	.560	.562	.000	.003T
2504	Inlet Variable Front Compressor Stator Vane - - - - -	.4350	.4370		
	Inlet Stator Compressor Bearing - - - - -	.440	.4415	.0030*	.0065*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
2505	Plain Bearing - - - - -	.5620	.5625		
	Inlet Compressor Stator Front				
	Lever Arm - - - - -	.5622	.5628	.0003T*	.0008*
2506	Threaded Pin - - - - -	.1890	.1895		
	Sleeve Spacer - - - - -	.1900	.1905	.0005*	.0015*
2507	Machine Bolt - - - - -	.2475	.2490		
	Compressor Stator Connecting				
	Link - - - - -	.2495	.2500	.0005*	.0025*
2508	Inlet Compressor Stator Front				
	Synchronizing Ring - - - - -	.3120	.3130		
	Sleeve Spacer - - - - -	.3125	.3130	.0001T*	.0005*
2509	Side Clearance: 3rd Stage				
	Compressor Blade Lock - - - -	.130	.132		
	3rd Stage Compressor Disk - - -	.133	.137	.001*	.007*
2510	Headless Shoulder Pin - - - - -	.1245	.1246		
	Compressor Inlet Case - - - - -	.1235	.1245	.0000*	.0011T*
2511	Headless Shoulder Pin - - - - -	.1245	.1246		
	Compressor Inlet Case - - - - -	.1235	.1245	.0000*	.0011T*
2512	Clevis Pin - - - - -	.2476	.2489		
	Self Aligning Bearing - - - - -	.2495	.2500	.0015*	.0030*
2513	Clevis Pin - - - - -	.2476	.2489		
	Rod End Clevis - - - - -	.2495	.2515	.0015*	.0045*
2514	Headless Shoulder Pin - - - - -	.1245	.1246		
	Compressor Inlet Case - - - - -	.1235	.1245	.0000*	.0011T*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
2515	Sleeve Nut - - - - -	.384	.386		
	Rod End Clevis - - - - -	.364	.374	.010*	.022*
2516	Height of Step: No. 1 Bearing				
	Face Seal - - - - -			.190*	.200*
2517	Self Aligning Plain Bearing -	.5620	.5625		
	Compressor Case Bracket - - - -	.5622	.5628	.0008*	.0003T*
2518	Headless Shoulder Pin - - - - -	.3740	.3745		
	Compressor Stator Linkage Bell				
	Crank - - - - -	.3752	.3772	.0007*	.0032*
2519	Headless Shoulder Pin - - - - -	.3740	.3745		
	Compressor Stator Bell Crank				
	Support - - - - -	.3750	.3765	.0005*	.0025*
2521	Flanged Bushing - - - - -	.5012	.5017		
	Compressor Stator Linkage Bell				
	Crank - - - - -	.5000	.5010	.0002T*	.0017T*
2522	Machine Bolt - - - - -	.2475	.2490		
	Self Aligning Bearing - - - - -	.2495	.2500	.0005*	.0025*
2523	Headless Straight Pin - - - - -	.1245	.1246		
	No. 1 Bearing - - - - -	.1238	.1245	.0000*	.0008T*
2524	Pin Protrusion: Headless				
	Straight Pin - - - - -				
	No. 1 Bearing - - - - -			.062*	.072*
2525	Fan Case - - - - -	32.638	32.648		
	2nd Stage Compressor Stator				
	Assembly - - - - -	32.640	32.660	.008*	.018T*
2526	Fan Case - - - - -	33.019	33.029		
	2nd Stage Compressor Stator				
	Assembly - - - - -	33.020	33.040	.009*	.021T*

Table 1. Fits and Clearances (See FO-1.) (continued)

Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
2527	Fan Case - - - - -	34.234	34.244		
	1st Stage Compressor Stator Assembly - - - - -	34.236	34.252	.008*	.018T*
2528	Fan Case - - - - -	34.959	34.969		
	1st Stage Compressor Stator Assembly - - - - -	34.960	34.980	.009*	.021T*
2529	Inlet Compressor Stator - - - - -	11.812	11.816		
	Vane Compressor Stator Outer Inlet Bearing To Inner Inlet Bearing - - - - -	11.817	11.837	.001*	.025*
2530	Threaded Pin - - - - -	.1890	.1895		
	Inlet Compressor Stator Front Synchronizing Ring Assembly - -	.1895	.1905	.000*	.0015*
2771	Clearance between the supported section of a tube assembly and any adjacent tube or structure			.030*	
	Clearance between the supported section of any tube assembly and any operating mechanism			.090*	
	Clearance between the unsupported section of any tube assembly and any adjacent tube or structure			.090*	
	Clearance between the unsupported section of any tube assembly and any operating mechanism			.120*	
	Visual evidence of chafing between tube assemblies and other adjacent parts is not acceptable.				

Table 2. Blade Tip Radial Clearances With Rotor Loaded Forward (See FO-1.)

Ref No.	Name	Dimensions for Ref		Limits	
		Min	Max	Min	Max
2751	1st Stage Blade - - - - -	34.875	34.911		
	(1st Stage) Compressor Air Seal	35.115	35.125	.102*	.125*
2752	2nd Stage Blade - - - - -	32.760	32.794		
	(2nd Stage) Compressor Air Seal	32.963	32.973	.0845*	.1065*
2753	3rd Stage Blade - - - - -	31.381	31.416		
	(3rd Stage) Compressor Air Seal	31.613	31.623	.0985*	.1210*

Table 3. Torque Limits (See FO-1.)


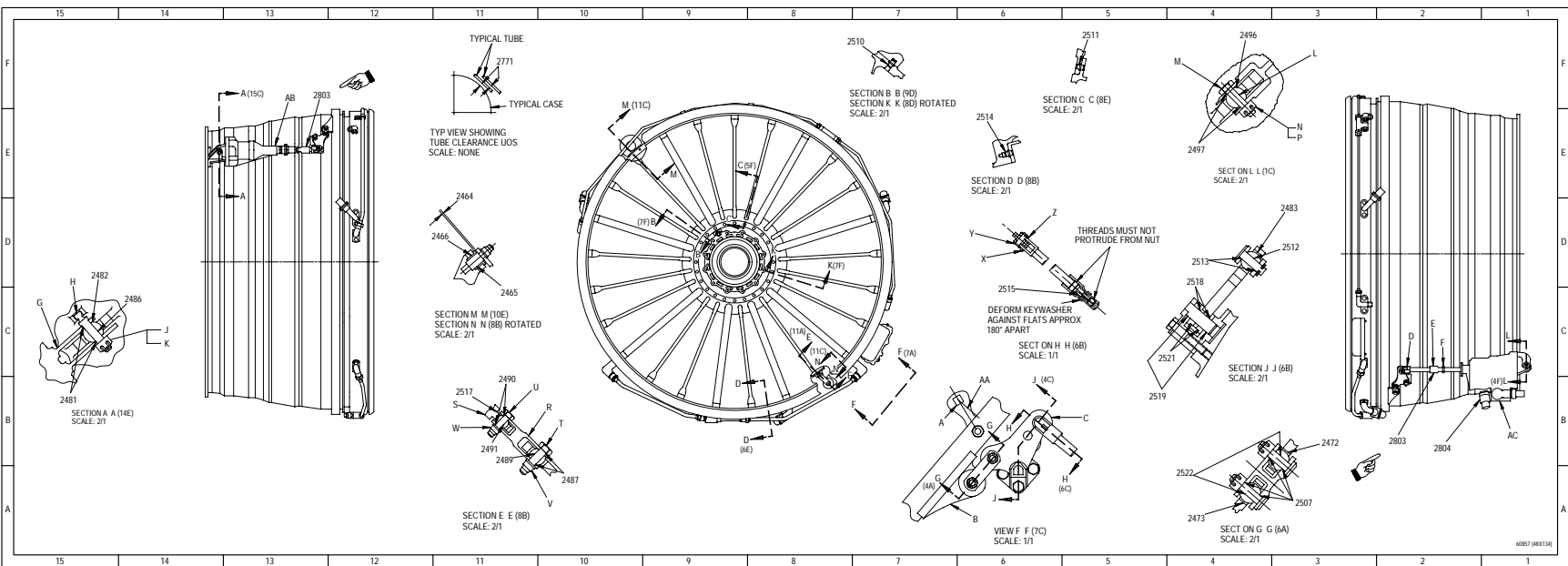
Ref No.	Name	Limits	
		Min	Max
2801	Bearing Retaining Nut		
<div style="text-align: center;">  </div> <p>Do not translate bearing without relative rotation between inner and outer bearing races.</p> <ol style="list-style-type: none"> 1. Apply lubricant MIL-L-7808 engine oil or equivalent before installation. 2. Check run-on torque to ensure it is 500 to 5000 lb-in. Total torque must be run-on torque plus 900 to 1000 lb-in. plus angle-of-turn torque. 3. Tighten nut to 900 to 1000 lb-in. plus run-on torque. In addition, turn nut thru an angle of 14° 0' to 16° 30' and then loosen it to run-on torque. 4. Retighten nut to 900 to 1000 lb-in. plus run-on torque. 5. Establish common reference points between nut and mating part. 6. Turn nut thru an additional angle of 14° 0' to 16° 30'. 7. Loosen nut to run-on torque and repeat step 4. 8. If nut reference point is in line with mating part reference point or beyond it within 0° 30' maximum apply final angle of turn per step 6. 9. If reference points are not within limits, repeat steps 4, 5, and 6 in order, until reference points are within limits, then perform step 8. 			

Table 3. Torque Limits (See FO-1.) (continued)

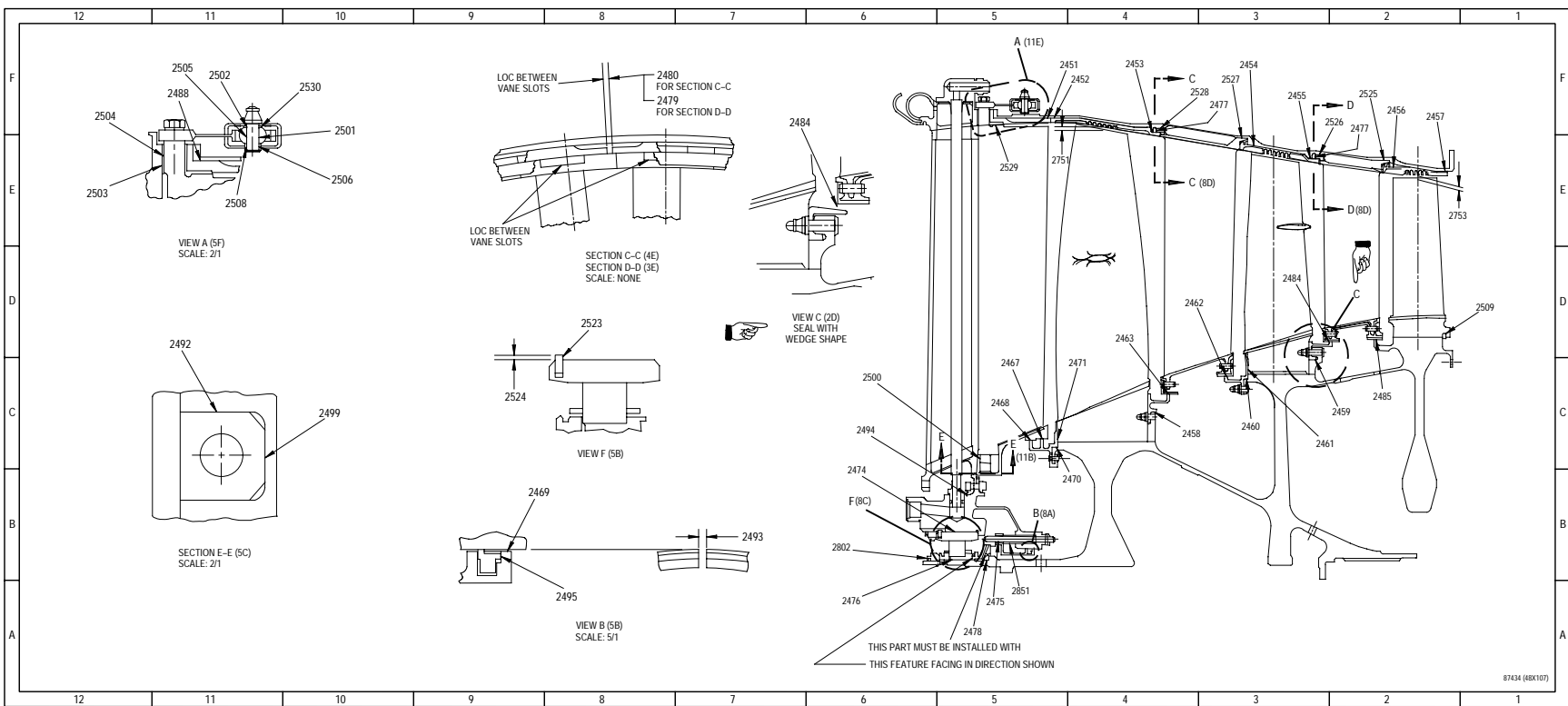
Ref No.	Name	Limits	
		Min	Max
2802	Bearing Retaining Nut 1. Apply lubricant MIL-L-7808 engine oil or equivalent before installation. 2. Check run-on torque to ensure it is 750 to 7000 lb-in. Total torque must be run-on torque plus 2400 lb-in. 3. Tighten nut to 2400 lb-in. plus run-on torque.		
2803	Compressor Inlet Variable Vane Control and Cylinder and Compressor Inlet Variable Vane Linear Actuating Cylinder Sleeve Nut PN 4075565 and PN 4075566 clevis(V-slot) -	75 lb-in.	85 lb-in.
	PN 4083038 and PN 4083039 clevis(square slot) - - - - -	135 lb-in.	165 lb-in.
2804	Borescope Plug - - - - -	460 lb-in.	515 lb-in.

Table 4. Torque Limits (See FO-1.)

Ref No.	Name	Limits	
		Min	Max
2851	No. 1 Bearing Face Seal Spring at 1.924 In.	0 lb- 8 oz.	0 lb- 12 oz.
	at 1.160 In. - - - - -	2 lb- 6 oz.	3 lb- 2 oz.



FO-1. Inlet/Fan Module - Dimensional Limits and Torque Values (Sheet 1 of 2)



FO-2. Inlet/Fan Module - Dimensional Limits and Torque Values (Sheet 2 of 2)

